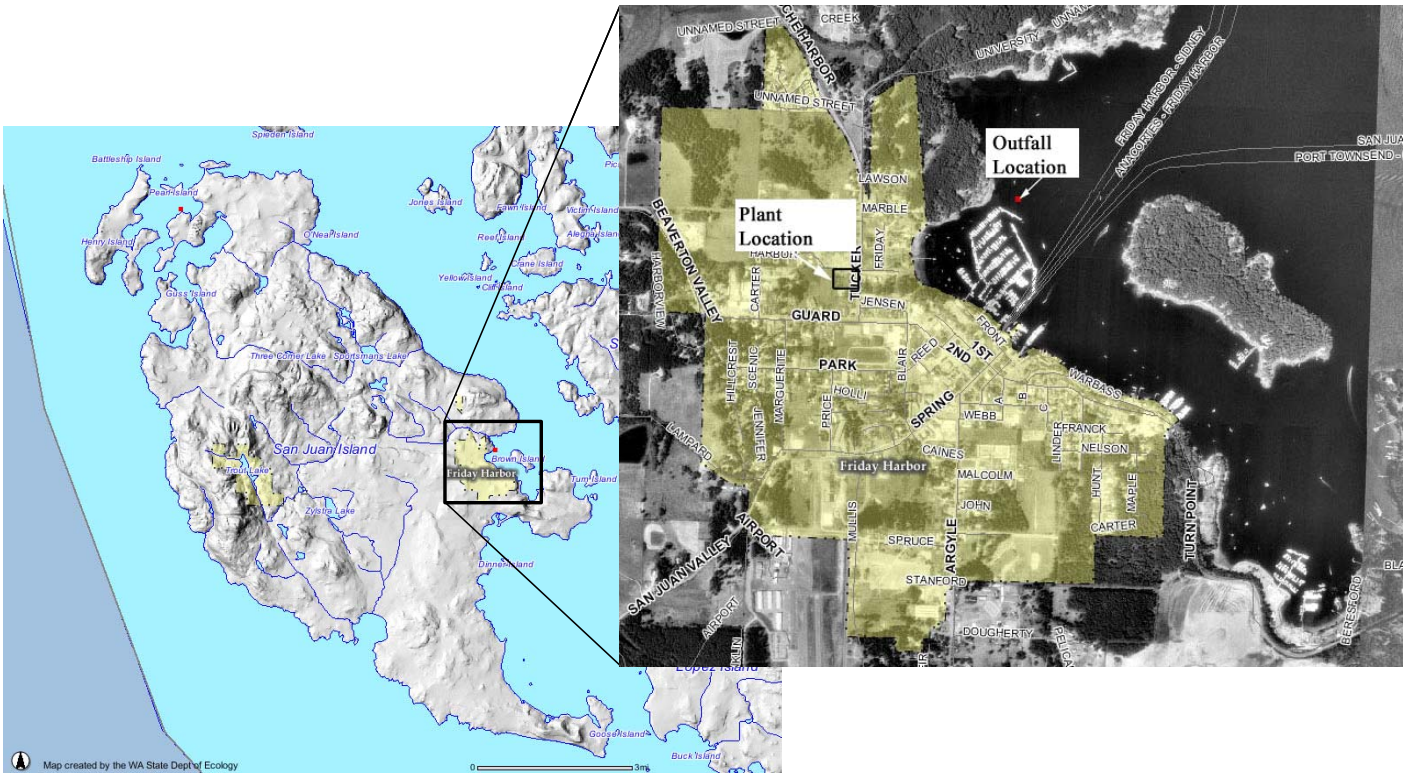
FACT SHEET FOR NPDES PERMIT WA-002358-2
TOWN OF FRIDAY HARBOR WASTEWATER TREATMENT PLANT



SUMMARY

This fact sheet is a companion document to the draft National Pollutant Discharge Elimination System (NPDES) Permit for the Town of Friday Harbor Wastewater Treatment Plant (WWTP). The fact sheet explains the nature of the proposed discharges, the Department of Ecology's (the Department's) decisions on limiting the pollutants in the wastewater, and the regulatory and technical basis for those decisions. The fact sheet and draft permit are available for review (see Appendix A—Public Involvement for more detail on the public notice procedures).

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INTRODUCTION

The Federal Clean Water Act (FCWA, 1972, and later modifications, 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System of permits (NPDES permits), which is administered by the Environmental Protection Agency (EPA). The EPA has authorized the State of Washington to administer the NPDES permit program. Chapter 90.48 RCW defines the Department of Ecology's authority and obligations in administering the Wastewater Discharge Permit Program.

The regulations adopted by the State include procedures for issuing permits (Chapter 173-220 WAC), technical criteria for discharges from municipal wastewater treatment facilities (Chapter 173-221 WAC), water quality criteria for surface and ground waters (Chapters 173-201A and 200 WAC), and sediment management standards (Chapter 173-204 WAC). These regulations require that a permit be issued before discharge of wastewater to waters of the state is allowed. The regulations also establish the basis for effluent limitations and other requirements which are to be included in the permit. One of the requirements (WAC 173-220-060) for issuing a permit under the NPDES permit program is the preparation of a draft permit and an accompanying fact sheet. Public notice of the availability of the draft permit is required at least thirty (30) days before the permit is issued (WAC 173-220-050). The fact sheet and draft permit are available for review (see Appendix A—Public Involvement of the fact sheet for more detail on the public notice procedures).

The fact sheet and draft permit have been reviewed by the Permittee. Errors and omissions identified in this review have been corrected before going to public notice. After the public comment period has closed, the Department will summarize the substantive comments and the response to each comment. The summary and response to comments will become part of the file on the permit and parties submitting comments will receive a copy of the Department's response. The fact sheet will not be revised. Comments and the resultant changes to the permit will be summarized in Appendix D—Response to Comments.

GENERAL INFORMATION	
Applicant	Town of Friday Harbor
Facility Name and Address	375 Tucker Avenue Friday Harbor, WA 98250
Responsible Official	Honorable David F. Jones, Mayor P.O. Box 219 Friday Harbor, WA 98250
Plant Contact	Don Reitan, Wastewater Lead Operator P.O. Box 219 Friday Harbor, WA 98250
Type of Treatment	Sequencing Batch Reactor Activated Sludge
Discharge Location	Friday Harbor to San Juan Channel Latitude: 42° 32' 28" N Longitude: 123° 00' 48" W
Waterbody ID Number	1224026474620 (old ID: WA 02-0030)

BACKGROUND INFORMATION

DESCRIPTION OF THE FACILITY

HISTORY

The Town of Friday Harbor expanded its original primary treatment plant to secondary treatment in 1984. At that time, the secondary plant was constructed with limited reserve capacity for growth. The reserve capacity was exceeded in approximately ten years time, requiring further expansion to accommodate future growth.

In 1997, the Department approved engineering plans and specifications to upgrade the secondary treatment plant's treatment capacity with an addition of new blowers. In 2001, an updated general sewer plan was submitted and approved to address lingering issues regarding plant capacity for future growth. This plan recommended replacement of the existing secondary treatment plant with a new Sequencing Batch Reactor activated sludge plant. The project to upgrade the plant to an SBR system was initiated in September 2002 and was fully completed in April 2004.

Planning for the current facility is based on population projections through 2015. Current population (estimated for 2004) is 2,075. The 2015 design population for the facility is 2,472, and the current site has the capacity to serve a build-out population of 5,120. Population growth rates are presently slightly less than the 1.4 percent annual rate used for design planning in the 2001 general sewer plan.

COLLECTION SYSTEM STATUS

The collection system serves an area of approximately 430 acres divided into 15 subbasins. The system consists of approximately 44,000 feet of collection lines and five satellite and one in-plant pump stations. Collection is predominantly from residential and small commercial connections. However, the system includes conveyance from the University of Washington's Friday Harbor Laboratories along with a metered connection to accept vessel wastewater from Washington State ferries using freshwater toilet and sink fixtures. No septage is currently accepted at the facility, however, the Town and San Juan County have discussed alternatives for using the treatment plant as a septage handling facility.

The existing collection system includes an approximately 2,000-foot long, 10" submarine force main that runs under the harbor and ferry docks. This force main carries flow from pump station #1, which services the southeast section of town, and pump station #2. This line has experienced a number of breaks in the past; leading to the discharge of untreated sewage to the harbor and plant upsets due to saltwater intrusion. Rehabilitation of this line is the focus of Agreed Order #2746, signed by the Town and the Department in September 2005. The order requires the Town to replace the line with a more reliable alternative, which will minimize the potential for raw sewage discharges and plant upsets due to saltwater intrusion.

Inflow and infiltration was last evaluated in 2004. That evaluation indicated a 17 percent increase in I&I as compared to the base year flow established for 1999. The 2004 I&I report concluded that there were mitigating factors contributing to flow increases and that I&I had not significantly increased over the 1999 base year. While I&I may not have increased in the system

significantly, the 2001 general sewer plan update indicates that I&I contributes significant flow during winter months. The Town has identified nine sewer line replacement projects and one manhole repair project that will reduce existing I&I. These projects are tentatively scheduled at a rate of one project per year over the next ten years.

TREATMENT PROCESSES

The Town of Friday Harbor utilizes a sequencing batch reactor activated sludge treatment system. The liquid stream process includes a headworks with screening and grit removal, reactor basins, effluent flow equalization, and UV disinfection. The solids process includes an aerobic digester, belt filter press, and sludge dryer. A schematic of the solids and liquid streams is included in Appendix F

Flow enters the plant at the influent pump station from a force main from pump station #2 and several gravity interceptors. Recycle flows from solids processing are also returned to the influent pump station. The pump station lifts the combined flow to the headworks, where it is screened with a perforated basket screen prior to flow measurement and sampling. Screened solids are dewatered, compacted, and transferred to a dumpster for disposal as solid waste. After screening, flow is sampled and passes through a Parshall flume prior to entering a grit chamber. Particles removed in the grit chamber are deposited in a classifier where the slurry is dewatered prior to deposition in a dumpster for solid waste disposal.

Screened and degritted wastewater flow leaves the headworks and is diverted to one of two Sequencing Batch Reactor basins. The SBR consists of two rectangular basins with jet aerators, floating decanters, and scum skimming troughs. Treatment alternates between two basins on six-hour intervals in the summer and four-hour intervals in the winter. Each cycle is composed of a half-hour anoxic fill phase, an aerated fill and react phase, a settling phase and a decant/idle phase. During the react phase, blowers for the jet aerators cycle on and off every 30 minutes. Baseline SBR operating parameters are shown in Table 1.

Table 1: SBR Base Operating Parameters

Parameter	Summer	Winter
Number of cycles per day	4	6
Cycle time	6 hours	4 hours
Anoxic fill	00:00 to 00:30	00:00 to 00:30
React (with and without fill)	00:30 to 4:00	00:30 to 2:00
Blowers cycle during React	30 min On/ 30 min Off	30 min On/ 30 min Off
Settling (no fill)	4:00 to 5:00	2:00 to 2:40
Idle/decant	5:00 to 6:00	3:10 to 4:00
Solids Retention Time (SRT)	8 days	12 days
Average wastewater temperature	21.5°C	13.5°C
Predicted effluent quality		
BOD	<15	<15
TSS	<15	<15

Source: Brown and Caldwell Permit Compliance Assistance Report

Decant from the SBR basins flow to flow equalization basins. The equalization basins, which served as secondary clarifiers for the previous plant, dampen the variations in flow inherent in batch processes. Effluent is withdrawn from the basins at a constant rate using submersible pumps and directed to the UV disinfection chambers. The basins have emergency bypasses that direct excess flow to the chlorine contact chamber in the event of an overfill situation.

Final effluent disinfection is achieved with the use of ultraviolet radiation. The UV system is a single channel system consisting of 24 horizontal lamps in two banks mounted in series. In the event of the loss of disinfection due to power or equipment failure or plant upset, hypochlorite solution is available to provide chemical disinfection. Use of hypochlorite for disinfection has been somewhat routine since November 2004 due to performance problems with the UV system and interference from high TSS concentrations. Chlorine disinfection is also used when the UV system is taken offline for cleaning and maintenance.

DISCHARGE OUTFALL

Secondary treated and disinfected effluent is discharged from the facility to Friday Harbor. An 18-inch pipe carries the effluent to the waterfront, and a 10-inch pipe then carries into the harbor. In 1984, the original 10-inch diameter outfall was extended with an additional 700 feet of 16-inch diameter pipe to 125 feet beyond the marina breakwater. The outfall pipe terminates at a depth of -55 feet mean lower low water (MLLW) and has a 45-foot long diffuser with four 4-inch ports at 15-foot spacing.

RESIDUAL SOLIDS

The treatment facilities remove solids during the treatment of the wastewater at the headworks (grit and screenings), and through wasting of excess biosolids from the SBR basins. In addition, incidental solids (rags, scum, and other debris) will be occasionally removed as part of the routine maintenance of the equipment. Grit, rags, scum, and screenings are disposed of as solid waste at the local landfill. Solids removed from the SBR are treated with an aerobic digester and dried with a belt filter press and sludge dryer. Dried biosolids are transported every two to three months to Water and Wastewater Services in LaConner for use in composting.

PERMIT STATUS

The previous permit for this facility was issued on July 27, 2000. The previous permit placed effluent limitations on 5-day Biochemical Oxygen Demand (BOD_5), Total Suspended Solids (TSS), pH, and Fecal Coliform bacteria.

An application for permit renewal was submitted to the Department on December 28, 2004, and accepted by the Department on February 16, 2005.

SUMMARY OF COMPLIANCE WITH THE PREVIOUS PERMIT

The facility received its last inspection on September 28, 2004, a Class II compliance inspection with sampling. A follow up technical assistance visit was made by the facility's municipal permit manager and the Department's operator outreach specialist on February 15, 2005. A site visit was also made on July 6, 2005, to observe the conditions of the submarine line.

The Friday Harbor facility reported numerous discharge violations during the course of the previous permit, as documented in Table 2. Some of the early violations could be attributed to problems with the previous plant. However, violations did not subside once the new plant was brought online. Saltwater intrusion, due to leaks in the submarine force main, may have also been a contributing factor to the violations.

Table 2: Permit Violation Summary

Date	Parameter	Units	Reported Value	Minimum Value Limit	Maximum Value Limit
4/1/2001	BOD, 5-DAY (20 DEG. C), AVW	MG/L	48		45
4/1/2001	SOLIDS, SUSPENDED, % REMOVAL, AVG	PERCENT	79	85	
4/1/2001	SOLIDS, TOTAL SUSPENDED, MAX	MG/L	49		45
8/1/2001	CHLORINE, TOTAL RESIDUAL, AVG	MG/L	0.53		0.5
8/1/2001	CHLORINE, TOTAL RESIDUAL, MAX	MG/L	0.79		0.75
9/1/2001	PH, MIN	S.U.	5.9	6	
3/1/2002	SOLIDS, SUSPENDED, % REMOVAL, AVG	PERCENT	81	85	
7/1/2003	COLIFORM, FECAL, GM7	#/100 ML	469		400
7/1/2003	SOLIDS, SUSPENDED, % REMOVAL, AVG	PERCENT	83	85	
9/1/2003	CHLORINE, TOTAL RESIDUAL, MAX	MG/L	0.88		0.75
1/1/2004	SOLIDS, SUSPENDED, % REMOVAL, AVG	PERCENT	74	85	
1/1/2004	SOLIDS, TOTAL SUSPENDED, AVG	MG/L	32		30
1/1/2004	SOLIDS, TOTAL SUSPENDED, MAX	MG/L	61		45
2/1/2004	COLIFORM, FECAL, GM7	#/100 ML	465		400
2/1/2004	SOLIDS, SUSPENDED, % REMOVAL, AVG	PERCENT	80	85	
3/1/2004	COLIFORM, FECAL, GM7	#/100 ML	592		400
3/1/2004	SOLIDS, SUSPENDED, % REMOVAL, AVG	PERCENT	79	85	
3/1/2004	SOLIDS, TOTAL SUSPENDED, MAX	MG/L	60		45
6/1/2004	CHLORINE, TOTAL RESIDUAL, MAX	MG/L	1.53		0.75
6/1/2004	COLIFORM, FECAL, GM7	#/100 ML	1500		400
6/1/2004	SOLIDS, SUSPENDED, % REMOVAL, AVG	PERCENT	77	85	
6/1/2004	SOLIDS, TOTAL SUSPENDED, AVG	MG/L	47		30
6/1/2004	SOLIDS, TOTAL SUSPENDED, MAX	MG/L	76		45
9/1/2004	COLIFORM, FECAL, GM7	#/100 ML	424		400
9/1/2004	SOLIDS, SUSPENDED, % REMOVAL, AVG	PERCENT	82	85	
9/1/2004	SOLIDS, TOTAL SUSPENDED, AVG	MG/L	35		30
9/1/2004	SOLIDS, TOTAL SUSPENDED, MAX	MG/L	54		45
10/1/2004	SOLIDS, SUSPENDED, % REMOVAL, AVG	PERCENT	84	85	
11/1/2004	CHLORINE, TOTAL RESIDUAL, MAX	MG/L	0.83		0.75
11/1/2004	SOLIDS, SUSPENDED, % REMOVAL, AVG	PERCENT	80	85	
11/1/2004	SOLIDS, TOTAL SUSPENDED, MAX	MG/L	53		45
1/1/2005	COLIFORM, FECAL, GEM	#/100 ML	206		200
1/1/2005	SOLIDS, TOTAL SUSPENDED, MAX	MG/L	49		45
5/1/2005	COLIFORM, FECAL, GM7	#/100 ML	4500		400
5/1/2005	SOLIDS, SUSPENDED, % REMOVAL, AVG	PERCENT	71	85	
5/1/2005	SOLIDS, TOTAL SUSPENDED, AVG	LBS/DAY	215		168
5/1/2005	SOLIDS, TOTAL SUSPENDED, AVW	LBS/DAY	762		251

Date	Parameter	Units	Reported Value	Minimum Value Limit	Maximum Value Limit
5/1/2005	SOLIDS, TOTAL SUSPENDED, AVG	MG/L	67		30
5/1/2005	SOLIDS, TOTAL SUSPENDED, MAX	MG/L	201		45
6/1/2005	CHLORINE, TOTAL RESIDUAL, AVG	MG/L	0.54		0.5
6/1/2005	CHLORINE, TOTAL RESIDUAL, MAX	MG/L	2.01		0.75
6/1/2005	COLIFORM, FECAL, GEM	#/100 ML	215		200
6/1/2005	COLIFORM, FECAL, GM7	#/100 ML	5000		400
6/1/2005	SOLIDS, SUSPENDED, % REMOVAL, AVG	PERCENT	84	85	
6/1/2005	SOLIDS, TOTAL SUSPENDED, AVG	MG/L	41		30
6/1/2005	SOLIDS, TOTAL SUSPENDED, MAX	MG/L	67		45
7/1/2005	CHLORINE, TOTAL RESIDUAL, AVG	MG/L	0.67		0.5
7/1/2005	CHLORINE, TOTAL RESIDUAL, MAX	MG/L	1.13		0.75
7/1/2005	SOLIDS, SUSPENDED, % REMOVAL, AVG	PERCENT	79	85	
7/1/2005	SOLIDS, TOTAL SUSPENDED, AVG	MG/L	66		30
7/1/2005	SOLIDS, TOTAL SUSPENDED, MAX	MG/L	113		45

Due to the repeated violations, the Department issued Notice of Violation #1902 in January 2005. A follow up to the NOV was sent in March 2005, that requested the Town to provide monthly status reports on projects that would aid in eliminating the violations. In response to continued permit violations and a series of failures of the submarine force main, the Town and the Department entered into Agreed Order #2746 in September 2005. The order's primary goals are to address long-term treatment reliability at the plant and to prevent future discharges of raw sewage through the degraded submarine force main. Select correspondence related to the history of enforcement actions can be found in Appendix E.

WASTEWATER CHARACTERIZATION

The concentration of pollutants in the discharge was reported in the NPDES application and in Discharge Monitoring Reports. The effluent is characterized as follows:

Table 3: Wastewater Characterization

Parameter	Value
Flow (maximum monthly average)	0.286 MGD
pH (average range)	6.4 – 7.4
Temperature (maximum winter)	14.5ºC
Temperature (maximum summer)	23.3ºC
BOD_5 (average, maximum)	12 mg/l, 53 mg/l
TSS (average, maximum)	20 mg/l, 122 mg/l
Fecal Coliform (average, maximum)	59 cfu/100 ml, 5000 cfu/100 ml
Residual Chlorine (average, maximum)	0.32 mg/l, 2.20 mg/l

PROPOSED PERMIT LIMITATIONS

Federal and State regulations require that effluent limitations set forth in a NPDES permit must be either technology- or water quality-based. Technology-based limitations for municipal discharges are set by regulation (40 CFR 133, and Chapters 173-220 and 173-221 WAC). Water quality-based limitations are based upon compliance with the Surface Water Quality Standards (Chapter 173-201A WAC), Ground Water Standards (Chapter 173-200 WAC), Sediment Quality Standards (Chapter 173-204 WAC), or the National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992). The most stringent of these types of limits must be chosen for each of the parameters of concern. Each of these types of limits is described in more detail below.

The limits in this permit are based in part on information received in the application. The effluent constituents in the application were evaluated on a technology- and water quality-basis. The limits necessary to meet the rules and regulations of the State of Washington were determined and included in this permit. Ecology does not develop effluent limits for all pollutants that may be reported on the application as present in the effluent**.** Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation**.** Effluent limits are not always developed for pollutants that may be in the discharge but not reported as present in the application. In those circumstances, the permit does not authorize discharge of the non-reported pollutants. Effluent discharge conditions may change from the conditions reported in the permit application. If significant changes occur in any constituent, as described in 40 CFR 122.42(a), the Permittee is required to notify the Department of Ecology. The Permittee may be in violation of the permit until the permit is modified to reflect additional discharge of pollutants.

DESIGN CRITERIA

In accordance with WAC 173-220-150 (1)(g), flows or waste loadings shall not exceed approved design criteria.

The design criteria for this treatment facility are taken from the 2002 Town of Friday Harbor Wastewater Treatment Plant Improvements, Plan Drawings prepared by Brown and Caldwell and are as follows:

Table 4: Design Standards for Town of Friday Harbor WWTP

Parameter	Design Quantity
Monthly average flow (maximum month)	0.69 MGD
Monthly average dry weather flow	0.33 MGD
Instantaneous peak flow	2.6 MGD
BOD_5 influent loading	1,600 lb/day
TSS influent loading	1,110 lb/day
Design population equivalent	2,472

TECHNOLOGY-BASED EFFLUENT LIMITATIONS

Municipal wastewater treatment plants are a category of discharger for which technology-based effluent limits have been promulgated by federal and state regulations. These effluent limitations are given in the Code of Federal Regulations (CFR) 40 CFR Part 133 (federal) and in Chapter 173-221 WAC (state). These regulations are performance standards that constitute all known, available and reasonable methods of prevention, control, and treatment for municipal wastewater.

The following technology-based limits for pH, fecal coliform, BOD_5, and TSS are taken from Chapter 173-221 WAC:

Table 5: Technology-based Limits

Parameter	Limit
pH	Shall be within the range of 6 to 9 standard units
Fecal Coliform Bacteria	Monthly Geometric Mean = 200 organisms/100 mL Weekly Geometric Mean = 400 organisms/100 mL
BOD_5 (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L
TSS (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L
Chlorine (normal operation)	Average Monthly Limit = 0 mg/L Average Weekly Limit = 0 mg/L
Chlorine (emergency operation)	*Average Monthly Limit = 0.5 mg/L* *Average Weekly Limit = 0.75 mg/L*

The technology-based monthly average limitation of 0 mg/L for chlorine is based on the use of ultraviolet light disinfection. As this technology operates without the addition of chemicals, a discharge limit of zero for disinfection-related chemicals is warranted.

In the event that chlorine use is required due to failure of the UV system, the Permittee will be allowed to exceed the zero limit on a short-term basis. Whenever chlorine use is necessary, technology-based chlorine limits derived from standard operating practices will apply. The Water Pollution Control Federation's Chlorination of Wastewater (1976) states that a properly designed and maintained wastewater treatment plant can achieve adequate disinfection if a 0.5 mg/liter chlorine residual is maintained after fifteen minutes of contact time. See also Metcalf and Eddy, Wastewater Engineering, Treatment, Disposal and Reuse, Fourth Edition, 2003. A treatment plant that provides adequate chlorination contact time can meet the 0.5 mg/liter chlorine limit on a monthly average basis. According to WAC 173-221-030(11)(b), the corresponding weekly average is 0.75 mg/liter.

The following technology-based mass limits are based on WAC 173-220-130(3)(b) and 173-221-030(11)(b).

Monthly effluent mass loading (lb/day) for BOD_5 was calculated as:

Maximum monthly design flow (0.69 MGD) x Concentration limit (30 mg/L) x 8.34 (conversion factor) = mass limit 173 lb/day.

The weekly average effluent mass loading is calculated as 1.5 x monthly loading = 260 lb/day.

Monthly effluent mass loading (lb/day) for TSS was calculated as:

Maximum monthly influent design loading (1110 lb/day) x 0.15 = 167 lb/day.

The weekly average effluent mass loading is calculated as 1.5 x monthly loading = 251 lb/day.

SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS

In order to protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 states that waste discharge permits shall be conditioned such that the discharge will meet established surface water quality standards. The Washington State Surface Water Quality Standards (Chapter 173-201A WAC) is a state regulation designed to protect the beneficial uses of the surface waters of the state. Water quality-based effluent limitations may be based on an individual waste load allocation (WLA) or on a WLA developed during a basin-wide total maximum daily loading study (TMDL).

NUMERICAL CRITERIA FOR THE PROTECTION OF AQUATIC LIFE

"Numerical" water quality criteria are numerical values set forth in the State of Washington's Water Quality Standards for Surface Waters (Chapter 173-201A WAC). They specify the levels of pollutants allowed in a receiving water while remaining protective of aquatic life. Numerical criteria set forth in the water quality standards are used along with chemical and physical data for the waste water and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limitations, they must be used in a permit.

NUMERICAL CRITERIA FOR THE PROTECTION OF HUMAN HEALTH

The state was issued 91 numeric water quality criteria for the protection of human health by the U.S. EPA (EPA 1992). These criteria are designed to protect humans from cancer and other diseases and are primarily applicable to fish and shellfish consumption and drinking water from surface waters.

NARRATIVE CRITERIA

In addition to numerical criteria, "narrative" water quality criteria (WAC 173-201A-030) limit toxic, radioactive, or deleterious material concentrations below those which have the potential to adversely affect characteristic water uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health. Narrative criteria protect the specific beneficial uses of all fresh (WAC 173-201A-130) and marine (WAC 173-201A-140) waters in the state of Washington.

ANTIDEGRADATION

The State of Washington's Antidegradation Policy requires that discharges into a receiving water shall not further degrade the existing water quality of the water body. In cases where the natural conditions of a receiving water are of lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. Similarly, when receiving waters are of higher quality than the criteria assigned, the existing water quality shall be protected. More information on the State Antidegradation Policy can be obtained by referring to WAC 173-201A-070.

The Department has reviewed existing records and is unable to determine if ambient water quality is either higher or lower than the designated classification criteria given in Chapter 173-201A WAC; therefore, the Department will use the designated classification criteria for this water body in the proposed permit. The discharges authorized by this proposed permit should not cause a loss of beneficial uses.

DESCRIPTION OF THE RECEIVING WATER

The facility discharges to Friday Harbor, which is designated as a Class AA Marine receiving water in the vicinity of the outfall. There are no other point source outfalls in the vicinity of the outfall. The potential exists for boats moored at the Friday Harbor Marina and in other locations in the harbor to be significant non-point sources of pollutants. However, the Department has no documentation that would quantify this potential. Characteristic uses for this water body include the following:

> *Water supply (domestic, industrial, agricultural), stock watering, fish and shellfish (salmonid migration, rearing, spawning, and harvesting; other fish migration, rearing, spawning, and harvesting; clam, oyster, and mussel rearing, spawning, and harvesting; crustaceans and other shellfish [crabs, shrimp, crayfish, scallops, etc.] rearing, spawning, and harvesting), wildlife habitat, recreation (primary contact recreation, sport fishing, boating, and aesthetic enjoyment), commerce and navigation.*

Water quality of this class shall markedly and uniformly exceed the requirements for all or substantially all uses.

SURFACE WATER QUALITY CRITERIA

Applicable criteria are defined in Chapter 173-201A WAC for aquatic biota. In addition, U.S. EPA has promulgated human health criteria for toxic pollutants (EPA 1992). Criteria for this discharge are summarized below:

Fecal Coliforms	14 organisms/100 mL maximum geometric mean
Dissolved Oxygen	7 mg/L minimum
Temperature	13 degrees Celsius maximum or incremental increases above background
pH	7.0 to 8.5 standard units
Turbidity	Less than 5 NTUs above background
Toxics	No toxics in toxic amounts (see Appendix C for numeric criteria for toxics of concern for this discharge)

MIXING ZONES

The Water Quality Standards allow the Department of Ecology to authorize mixing zones around a point of discharge in establishing surface water quality-based effluent limits. Both "acute" and "chronic" mixing zones may be authorized for pollutants that can have a toxic effect on the aquatic environment near the point of discharge. The concentration of pollutants at the boundary of these mixing zones may not exceed the numerical criteria for that type of zone. Mixing zones can only be authorized for discharges that are receiving all known, available, and reasonable methods of prevention, control and treatment (AKART) and in accordance with other mixing zone requirements of WAC 173-201A-100.

The National Toxics Rule (EPA, 1992) allows the chronic mixing zone to be used to meet human health criteria.

CRITICAL CONDITIONS

Surface water quality-based limits are derived for the waterbody's critical condition, which represents the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or characteristic waterbody uses.

Critical ambient conditions, based on values used for mixing zone modeling prepared for the 1995 General Sewer Plan and Wastewater Facilities Engineering Report (KCM, Inc.), are as follows:

Table 6: Mixing Zone Critical Conditions

Parameter	Value Used
Depth	55 feet (Mean Lower Low Water)
Water Temperature	15.1°C at surface, 11.1°C at outfall depth
Minimum Current	0.0508 m/s
Salinity	29.1 ppm at surface, 30.1 ppm at outfall depth
Critical plant flow for acute conditions	1.76 MGD (peak daily flow reported on monthly DMRs between 11/2002 and 10/2005)
Critical plant flow for chronic conditions	0.5 MGD (maximum monthly average flow reported on monthly DMRs between 11/2002 and 10/2005)

CONSIDERATION OF SURFACE WATER QUALITY-BASED LIMITS FOR NUMERIC CRITERIA

Pollutant concentrations in the proposed discharge exceed water quality criteria with technology-based controls which the Department has determined to be AKART. A mixing zone is authorized in accordance with the geometric configuration, flow restriction, and other restrictions for mixing zones in Chapter 173-201A WAC and are defined as follows:

> *Chronic mixing zones, singularly or in combination with other mixing zones, shall not extend in any horizontal direction from the discharge port(s) for a distance greater than three hundred feet plus the depth of water over the discharge port(s) as measured during mean lower low water. Acute mixing zones shall not extend beyond ten percent of the distance established for chronic mixing zones, as measured independently from the discharge port(s).*

The dilution factors of effluent to receiving water that occur within these zones have been determined at the critical condition by the use EPA's Visual Plumes software using UM3 (three-dimensional Updated Merge Model) protocols. Results from the model can be found in Appendix H, along with a discussion on the mixing zone size. Estimated dilution factors are listed in Table 7.

Table 7: Dilution Factors

	Acute	**Chronic**
Aquatic Life	191.0	446.6
Human Health, Carcinogen		446.6
Human Health, Non-carcinogen		446.6

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near-field) or at a considerable distance from the point of discharge (far-field). Toxic pollutants, for example, are near-field pollutants—their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as BOD is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

The derivation of water quality-based limits also takes into account the variability of the pollutant concentrations in both the effluent and the receiving water.

BOD_5—This discharge with technology-based limitations results in a small amount of BOD loading relative to the large amount of dilution occurring in the receiving water at critical conditions. Technology-based limitations will be protective of dissolved oxygen criteria in the receiving water.

Temperature—The impact of the discharge on the temperature of the receiving water was modeled by simple mixing analysis at critical condition. The receiving water temperature at the outfall depth at critical condition is 11.10^{o}C, and the effluent temperature is 23.30^{o}C. The predicted resultant temperature at the boundary of the chronic mixing zone is 11.13^{o}C, and the incremental rise is 0.03^{o}C. Under critical conditions, there is no predicted violation of the Water Quality Standards for Surface Waters. Therefore, no effluent limitation for temperature was placed in the proposed permit.

pH—Because of the high buffering capacity of marine water, compliance with the technology-based limits of 6 to 9 will assure compliance with the Water Quality Standards for Surface Waters.

Fecal Coliform—The numbers of fecal coliform were modeled by simple mixing analysis using the technology-based limit of 400 organisms per 100 ml and a dilution factor of 446.6:1. Under critical conditions, there is no predicted violation of the Water Quality Standards for Surface Waters with the technology-based limit. Therefore, the technology-based effluent limitation for fecal coliform bacteria was placed in the proposed permit.

Toxic Pollutants—Federal regulations (40 CFR 122.44) require NPDES permits to contain effluent limits for toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. This process occurs concurrently with the derivation of technology-based effluent limits. Facilities with technology-based effluent limits defined in regulation are not exempted from meeting the Water Quality Standards for Surface Waters or from having surface water quality-based effluent limits.

The following toxics were determined to be present in the discharge: chlorine, ammonia, arsenic, copper, selenium, zinc, mercury, nickel and silver. A reasonable potential analysis (see Appendix I) was conducted on these parameters to determine whether or not effluent limitations would be required in this permit. The parameters used in the critical condition modeling are as follows: acute dilution factor 191, chronic dilution factor 447, receiving water temperature 11.1^{o}C.

No valid ambient background data was available for the pollutants listed above. A determination of reasonable potential using zero for background resulted in no reasonable potential. Given the high degree of mixing, lack of significant industrial dischargers and the low concentrations of pollutants in the effluent, improved knowledge of ambient conditions would not likely yield reasonable potential for this discharge to violate water quality standards. Therefore, no ambient water quality monitoring is included in this permit.

WHOLE EFFLUENT TOXICITY

The Water Quality Standards for Surface Waters require that the effluent not cause toxic effects in the receiving waters. Many toxic pollutants cannot be detected by commonly available detection methods. However, toxicity can be measured directly by exposing living organisms to the waste water in laboratory tests and measuring the response of the organisms. Toxicity tests measure the aggregate toxicity of the whole effluent, and therefore this approach is called whole effluent toxicity (WET) testing.

Toxicity caused by unidentified pollutants is not expected in the effluent from this discharge as determined by the screening criteria given in Chapter 173-205 WAC. Therefore, no whole effluent toxicity testing is required in this permit. The Department may require effluent toxicity testing in the future if it receives information that toxicity may be present in this effluent.

HUMAN HEALTH

Washington's Water Quality Standards now include 91 numeric health-based criteria that must be considered in NPDES permits. These criteria were promulgated for the state by the U.S. EPA in its National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992).

The Department has determined that the effluent is likely to have chemicals of concern for human health. The discharger's high priority status is based on knowledge of data or process information indicating regulated chemicals occur in the discharge. Information supplied by the town in the permit application indicates the presence of the following compounds in the effluent: selenium, mercury, nickel, chloroform, and toluene. These compounds have been identified as potential human health hazards for which water quality standards have been set.

A determination of the discharge's potential to cause an exceedance of the water quality standards was conducted as required by 40 CFR 122.44(d). The reasonable potential determination was evaluated with procedures given in the *Technical Support Document for Water Quality-Based Toxics* Control (EPA/505/2-90-001) and the Department's *Permit Writer's Manual* (Ecology Publication 92-109, July 1994). The determination indicated that the discharge has no reasonable potential to cause a violation of water quality standards for the listed compounds, thus effluent limits are not warranted,

SEDIMENT QUALITY

The Department has promulgated Aquatic Sediment Standards (Chapter 173-204 WAC) to protect aquatic biota and human health. These standards state that the Department may require Permittees to evaluate the potential for the discharge to cause a violation of applicable standards (WAC 173-204-400).

The Department has been unable to determine at this time the potential for this discharge to cause a violation of sediment quality standards. If the Department determines in the future that there is a potential for violation of the sediment quality standards, an order will be issued to require the Permittee to demonstrate that either the point of discharge is not an area of deposition or, if the point of discharge is a depositional area, that there is not an accumulation of toxics in the sediments.

GROUND WATER QUALITY LIMITATIONS

The Department has promulgated Ground Water Quality Standards (Chapter 173-200 WAC) to protect uses of ground water. Permits issued by the Department shall be conditioned in such a manner so as not to allow violations of those standards (WAC 173-200-100). This Permittee has no discharge to ground and therefore no limitations are required based on potential effects to ground water.

COMPARISON OF EFFLUENT LIMITS WITH THE EXISTING PERMIT ISSUED July 27, 2000

Parameter	Existing Limit	Proposed Limit
BOD		
Month Average, mg/L	30	30
Month Average, ppd	168	173
Weekly Average, mg/L	45	45
Weekly Average, ppd	251	260
TSS		
Month Average, mg/L	30	30
Month Average, ppd	168	167
Weekly Average, mg/L	45	45
Weekly Average, ppd	251	251
Fecal Coliform		
Monthly Average	200/100 ml	200/100 ml
Weekly Average	400/100 ml	400/100 ml
pH, allowable range	6.0 - 9.0 Std Units	6.0 - 9.0 Std Units
Total Residual Chlorine		
Monthly Average, mg/L	0.5	N/A*
Daily Maximum, mg/L	0.75	N/A*

* Under normal operating conditions with UV disinfection, the permit will not contain a limit for total residual chlorine. However, a limit of 0.5 mg/l Monthly Average and 0.75 mg/l Daily Maximum will apply at times when chlorine use is necessary due to UV system failure.

MONITORING REQUIREMENTS

Monitoring, recording, and reporting are required (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and the effluent limitations are being achieved.

The monitoring schedule is detailed in the proposed permit under Condition S.2. Specified monitoring frequencies take into account the quantity and variability of discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. The required monitoring frequency is consistent with agency guidance given in the current version of Ecology's *Permit Writer's Manual* (July 2004) for activated sludge plants operating at average flows of less than 2.0 MGD. Standard monitoring requirements for activated sludge plants are listed in Table 8.

In addition to compliance monitoring, the proposed permit will include monitoring to ensure adequate process control oversight. Proposed process control monitoring parameters are based on recommendations made by Brown and Caldwell's technical memorandum *Friday Harbor Wastewater Treatment Plant Permit Compliance Assistance Report*. Process monitoring parameters will include influent salinity, influent temperature, solids retention time, waste activated sludge flow rate, food-to-mass ratio, number of daily SBR cycles, the average daily cycle time, UV intensity, and UV transmittance.

Table 8: Standard Effluent Monitoring Requirements

Flow (MGD):	Continuous at influent or effluent
pH:	5/week final effluent grab sample
BOD5:	2/week, 24-hour composite samples of influent and effluent
TSS:	2/week, 24-hour composite samples of influent and effluent
Residual Chlorine:	Daily grab sample of final effluent (whenever chlorine is used)
Fecal Coliform:	5/week final effluent grab samples

Monitoring of biosolids quantity and quality is necessary to determine the appropriate uses of the biosolids. Biosolids monitoring is required by the current state and local Solid Waste Management Programs and also by EPA under 40 CFR 503. While Washington State has not yet been delegated authority to administer the Federal Biosolids Program, please note that EPA will consider the next application to be incomplete unless Form 2S, characterizing biosolids and sludge produced by the facilities, is also submitted. Form 2S involves a substantial amount of sludge testing in order to complete the application. Completed copies of this form needs to be submitted to EPA as well as to Ecology's Solid Waste and Financial Assistance Program.

LAB ACCREDITATION

With the exception of certain parameters, the permit requires all monitoring data to be prepared by a laboratory registered or accredited under the provisions of Chapter 173-50 WAC, *Accreditation of Environmental Laboratories.* The laboratory at this facility is accredited for general chemistry and biology.

OTHER PERMIT CONDITIONS

REPORTING AND RECORD KEEPING

The conditions of S3 are based on the authority to specify any appropriate reporting and record keeping requirements to prevent and control waste discharges (WAC 173-220-210).

PREVENTION OF FACILITY OVERLOADING

Overloading of the treatment plant is a violation of the terms and conditions of the permit. To prevent this from occurring, RCW 90.48.110 and WAC 173-220-150 require the Permittee to take the actions detailed in proposed permit Requirement S.4 to plan expansions or modifications before existing capacity is reached and to report and correct conditions that could result in new or increased discharges of pollutants. Condition S.4 restricts the amount of flow.

OPERATION AND MAINTENANCE (O&M)

The proposed permit contains Condition S.5 as authorized under RCW 90.48.110, WAC 173-220-150, Chapter 173-230 WAC, and WAC 173-240-080. It is included to ensure proper operation and regular maintenance of equipment, and to ensure that adequate safeguards are taken so that constructed facilities are used to their optimum potential in terms of pollutant capture and treatment.

RESIDUAL SOLIDS HANDLING

To prevent water quality problems, the Permittee is required in permit Condition S7 to store and handle all residual solids (grit, screenings, scum, sludge, and other solid waste) in accordance with the requirements of RCW 90.48.080 and State Water Quality Standards.

The final beneficial use or disposal of biosolids from this facility is regulated by U.S. EPA under 40 CFR 503, and by Ecology under Chapter 70.95J RCW and Chapter 173-308 WAC. The disposal of other solid waste is under the jurisdiction of the San Juan County Health Department.

PRETREATMENT

Federal and State Pretreatment Program Requirements

Under the terms of the addendum to the "Memorandum of Understanding between Washington Department of Ecology and the United States Environmental Protection Agency, Region 10" (1986), the Department of Ecology (Department) has been delegated authority to administer the Pretreatment Program (i.e. act as the Approval Authority for oversight of delegated Publicly Owned Treatment Works (POTWs))**.** Under this delegation of authority, the Department has exercised the option of issuing Wastewater Discharge Permits for significant industrial users discharging to POTWs which have not been delegated authority to issue Wastewater Discharge Permits.

There are a number of functions required by the Pretreatment Program, which the Department is delegating to such POTWs because they are in a better position to implement the requirements (e.g. tracking the number and general nature of industrial dischargers to the sewerage system). The requirements for a Pretreatment Program are contained in Title 40, Part 403 of the Code of Federal Regulations. Under the requirements of the Pretreatment Program (40 CFR 403.8(f)(1)(iii)), the Department is required to approve, condition, or deny new discharges or a significant increase in the discharge for existing significant industrial users (SIUs) (40 CFR 403.8 (f)(1)(i)).

The Department is responsible for issuing State Waste Discharge Permits to SIUs and other industrial users of the Permittee's sewer system. Industrial dischargers must obtain these permits from the Department prior to the Permittee accepting the discharge (WAC 173-216-110(5). (Industries discharging wastewater that is similar in character to domestic wastewater are not required to obtain a permit. Such dischargers should contact the Department to determine if a permit is required.) Industrial dischargers need to apply for a State Waste Discharge Permit sixty (60) days prior to commencing discharge. The conditions contained in the permits will include any applicable conditions for categorical discharges, loading limitations included in contracts with the POTW, and other conditions necessary to assure compliance with State Water Quality Standards and Biosolids Standards.

The Department requires this POTW to fulfill some of the functions required for the Pretreatment Program in the NPDES permit (e.g. tracking the number and general nature of industrial dischargers to the sewage system). The POTW's NPDES permit will require that all SIUs currently discharging to the POTW be identified and notified of the requirement to apply for a Wastewater Discharge Permit from the Department. None of the obligations imposed on the POTW relieve an industrial or commercial discharger of its primary responsibility for obtaining a Wastewater Discharge Permit (if required), including submittal of engineering reports prior to construction or modification of facilities (40 CFR 403.12(j) and WAC 173-216-070 and WAC 173-240-110, et seq.).

Wastewater Permit Required

RCW 90.48 and WAC 173-216-040 require SIUs to obtain a permit prior to discharge of industrial waste to the Permittee's sewerage system. This provision prohibits the POTW from accepting industrial wastewater from any such dischargers without authorization from the Department.

Requirements for Routine Identification and Reporting of Industrial Users

The NPDES permit requires non-delegated POTWs to "take continuous, routine measures to identify all existing, new, and proposed SIUs and potential significant industrial users (PSIUs) discharging to the Permittee's sewerage system." Examples of such routine measures include regular review of business tax licenses for existing businesses and review of water billing records and existing connection authorization records. System maintenance personnel can also be diligent during performance of their jobs in identifying and reporting as-yet unidentified industrial dischargers. Local newspapers, telephone directories, and word-of-mouth can also be important sources of information regarding new or existing discharges. The POTW is required to notify an industrial discharger, in writing, of their responsibilities regarding application for a State Waste Discharge Permit and to send a copy of the written notification to the Department. The Department will then take steps to solicit a State Waste Discharge Permit application.

Submittal of List of Industrial Users

This provision requires the POTW to submit a list of existing and proposed SIUs and PSIUs. This requirement is intended to update the Department once per permit cycle on the status of industrial users in the POTW's service area, without requiring the POTW to go through the process of performing a formal Industrial User Survey. This provision is normally applied to POTWs not serving industrial or commercial users. Although this permit does not require performance of an Industrial User Survey, the Permittee is nevertheless required under the previous section, to take adequate continuous routine measures to identify existing and new industrial discharges.

Duty to Enforce Discharge Prohibitions

This provision prohibits the POTW from authorizing or permitting an industrial discharger to discharge certain types of waste into the sanitary sewer. The first portion of the provision prohibits acceptance of pollutants which cause pass through or interference. The definitions of pass through and interference are in Appendix B of the fact sheet.

The second portion of this provision prohibits the POTW from accepting certain specific types of wastes, namely those which are explosive, flammable, excessively acidic, basic, otherwise corrosive, or obstructive to the system. In addition, wastes with excessive BOD, petroleum-based oils, or which result in toxic gases are prohibited to be discharged. The regulatory basis for these prohibitions is 40 CFR Part 403, with the exception of the pH provisions which are based on WAC 173-216-060.

The third portion of this provision prohibits certain types of discharges unless the POTW receives prior authorization from the Department. The discharges include cooling water in significant volumes, storm water and other direct inflow sources, and waste waters significantly affecting system hydraulic loading, which do not require treatment.

Support by the Department for Developing Partial Pretreatment Program by POTW

The Department has committed to providing technical and legal assistance to the Permittee in fulfilling these joint obligations, in particular, assistance with developing an adequate sewer use ordinance, notification procedures, enforcement guidelines, and developing local limits and inspection procedures.

GENERAL CONDITIONS

General Conditions are based directly on state and federal law and regulations and have been standardized for all individual municipal NPDES permits issued by the Department.

PERMIT ISSUANCE PROCEDURES

PERMIT MODIFICATIONS

The Department may modify this permit to impose numerical limitations, if necessary, to meet Water Quality Standards, Sediment Quality Standards, or Ground Water Standards, based on new information obtained from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

The Department may also modify this permit as a result of new or amended state or federal regulations.

RECOMMENDATION FOR PERMIT ISSUANCE

This proposed permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to protect human health, aquatic life, and the beneficial uses of waters of the state of Washington. The Department proposes that this permit be issued for five (5) years.

REFERENCES FOR TEXT AND APPENDICES

Brown and Caldwell

2001. Update to General Sewer Plan and Wastewater Facilities Engineering Report: Town of Friday Harbor.

2002. Town of Friday Harbor Wastewater Treatment Plant Improvement: Plan Drawings.

2005. Technical Memorandum: Friday Harbor Wastewater Treatment Plant Permit Compliance Assistance Report.

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1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.

1991. Technical Support Document for Water Quality-based Toxics Control. EPA/505/2-90-001.

1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington, D.C.

1985. Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. EPA/600/6-85/002a.

1983. Water Quality Standards Handbook. USEPA Office of Water, Washington, D.C.

KCM, Inc.

1995. General Sewer Plan and Wastewater Facilities Engineering Report.

Metcalf and Eddy.

1993. Wastewater Engineering, Treatment, Disposal, and Reuse. Fourth Edition.

Tsivoglou, E.C., and J.R. Wallace.

1972. Characterization of Stream Reaeration Capacity. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

Washington State Department of Ecology.

Laws and Regulations (http://www.ecy.wa.gov/laws-rules/index.html)

Permit and Wastewater Related Information (http://www.ecy.wa.gov/programs/wq/wastewater/index.html)

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1994. Permit Writer's Manual. Publication Number 92-109.

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1976. Chlorination of Wastewater.

Wright, R.M., and A.J. McDonnell.

1979. In-stream Deoxygenation Rate Prediction. Journal Environmental Engineering Division, ASCE. 105(EE2). (Cited in EPA 1985 op.cit.)

APPENDIX A—PUBLIC INVOLVEMENT INFORMATION

The Department has determined to reissue a permit to the applicant listed on page one of this fact sheet. The permit contains conditions and effluent limitations, which are described in the rest of this fact sheet.

Public Notice of Application (PNOA) was published on February 23, 2005, and March 2, 2005, in *The Journal of the San Juan Islands* to inform the public that an application had been submitted and to invite comment on the reissuance of this permit.

The Department published a Public Notice of Draft (PNOD) on April 5, 2006, in *The Journal of the San Juan Islands* to inform the public that a draft permit and fact sheet were available for review. Interested persons were invited to submit written comments regarding the draft permit. The draft permit, fact sheet, and related documents were available for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment, at the regional office listed below. Written comments were mailed to:

Water Quality Permit Coordinator
WA State Department of Ecology
Northwest Regional Office
3190 160th Avenue SE
Bellevue, WA 98008-5452

Any interested party may comment on the draft permit or request a public hearing on this draft permit within the thirty (30)-day comment period to the address above. The request for a hearing shall indicate the interest of the party and the reasons why the hearing is warranted. The Department will hold a hearing if it determines there is a significant public interest in the draft permit (WAC 173-220-090). Public notice regarding any hearing will be circulated at least thirty (30) days in advance of the hearing. People expressing an interest in this permit will be mailed an individual notice of hearing (WAC 173-220-100).

Comments should reference specific text followed by proposed modification or concern when possible. Comments may address technical issues, accuracy and completeness of information, the scope of the facility's proposed coverage, adequacy of environmental protection, permit conditions, or any other concern that would result from issuance of this permit.

The Department will consider all comments received within thirty (30) days from the date of public notice of draft indicated above, in formulating a final determination to issue, revise, or deny the permit. The Department's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

Further information may be obtained from the Department by telephone, (425) 649-7037, or by writing to the address listed above.

This permit and fact sheet were written by **Shawn McKone.**

APPENDIX B—GLOSSARY

Acute Toxicity—The lethal effect of a pollutant on an organism that occurs within a short period of time, usually 48 to 96 hours.

AKART—An acronym for "all known, available and reasonable methods of prevention, control, and treatment".

Ambient Water Quality—The existing environmental condition of the water in a receiving water body.

Ammonia—Ammonia is produced by the breakdown of nitrogenous materials in waste water. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect waste water.

Average Monthly Discharge Limitation—The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month (except in the case of fecal coliform). The daily discharge is calculated as the average measurement of the pollutant over the day.

Average Weekly Discharge Limitation—The highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week. The daily discharge is calculated as the average measurement of the pollutant over the day.

Best Management Practices (BMPs)—Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the state. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD_5—Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD_5 is used in modeling to measure the reduction of dissolved oxygen in a receiving water after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass—The intentional diversion of waste streams from any portion of a treatment facility.

$CBOD_5$—The quantity of oxygen utilized by a mixed population of microorganisms acting on the nutrients in the sample in an aerobic oxidation for five days at a controlled temperature of 20 degrees Celsius, with an inhibitory agent added to prevent the oxidation of nitrogen compounds. The method for determining $CBOD_5$ is given in 40 CFR Part 136.

Chlorine—Chlorine is used to disinfect waste waters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic Toxicity—The effect of a pollutant on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean Water Act (CWA)—The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Combined Sewer Overflow (CSO)—The event during which excess combined sewage flow caused by inflow is discharged from a combined sewer, rather than conveyed to the sewage treatment plant because either the capacity of the treatment plant or the combined sewer is exceeded.

Compliance Inspection - Without Sampling—A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance Inspection - With Sampling—A site visit to accomplish the purpose of a Compliance Inspection - Without Sampling and as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the percent removal requirement. Additional sampling may be conducted.

Composite Sample—A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing a minimum of four discrete samples. May be "time-composite" (collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots).

Construction Activity—Clearing, grading, excavation, and any other activity which disturbs the surface of the land. Such activities may include road building; construction of residential houses, office buildings, or industrial buildings; and demolition activity.

Continuous Monitoring—Uninterrupted, unless otherwise noted in the permit.

Critical Condition—The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Dilution Factor—A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the effluent fraction e.g., a dilution factor of 10 means the effluent comprises 10 percent by volume and the receiving water 90 percent.

Engineering Report—A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report shall contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal Coliform Bacteria—Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab Sample—A single sample or measurement taken at a specific time or over as short period of time as is feasible.

Industrial User—A discharger of wastewater to the sanitary sewer which is not sanitary wastewater or is not equivalent to sanitary wastewater in character.

Industrial Wastewater—Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business; from the development of any natural resource; or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

Infiltration and Inflow (I/I)—"Infiltration" means the addition of ground water into a sewer through joints, the sewer pipe material, cracks, and other defects. "Inflow" means the addition of precipitation-caused drainage from roof drains, yard drains, basement drains, street catch basins, etc., into a sewer.

Interference—A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal; and

Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent state or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including Title II, more commonly referred to as the Resource Conservation and Recovery Act [RCRA], and including state regulations contained in any state sludge management plan prepared pursuant to Subtitle D of the SWDA), sludge regulations appearing in 40 CFR Part 507, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

Major Facility—A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum Daily Discharge Limitation—The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Method Detection Level (MDL)—The minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is above zero and is determined from analysis of a sample in a given matrix containing the analyte.

Minor Facility—A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing Zone—A volume that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in state regulations (Chapter 173-201A WAC).

National Pollutant Discharge Elimination System (NPDES)—The NPDES (Section 402 of the Clean Water Act) is the federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the state of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both state and federal laws.

Pass through—A discharge which exits the POTW into waters of the state in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of State Water Quality Standards.

pH—The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

Potential Significant Industrial User—A potential significant industrial user is defined as an Industrial User which does not meet the criteria for a Significant Industrial User, but which discharges wastewater meeting one or more of the following criteria:

a. Exceeds 0.5 percent of treatment plant design capacity criteria and discharges <25,000 gallons per day; or

b. Is a member of a group of similar industrial users which, taken together, have the potential to cause pass through or interference at the POTW (e.g. facilities which develop photographic film or paper, and car washes).

The Department may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

Quantitation Level (QL)—A calculated value five times the MDL (method detection level).

Significant Industrial User (SIU)—

1) All industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N; and

2) Any other industrial user that: discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process wastestream that makes up five percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement (in accordance with 40 CFR 403.8(f)(6)).

Upon finding that the industrial user meeting the criteria in paragraph 2, above, has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority* may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

*The term "Control Authority" refers to the Washington State Department of Ecology in the case of non-delegated POTWs or to the POTW in the case of delegated POTWs.

State Waters—Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, wetlands, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

Stormwater—That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

Technology-based Effluent Limit—A permit limit that is based on the ability of a treatment method to reduce the pollutant.

Total Suspended Solids (TSS)—Total suspended solids are the particulate materials in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Upset—An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water Quality-based Effluent Limit—A limit on the concentration or mass of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into a receiving water.

APPENDIX C—TECHNICAL CALCULATIONS

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State Water Quality Standards can be found on the Department's homepage at http://www.ecy.wa.gov/programs/wq/wastewater/index.html

APPENDIX D—RESPONSE TO COMMENTS

No public comments were received in connection to this permit renewal.

APPENDIX E—HISTORY OF ENFORCEMENT ACTIONS

The following documents the history of enforcement actions pursued by the Department to correct violations of the Town of Friday Harbor's NPDES permit.

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Northwest Regional Office • 3190 160th Avenue SE • Bellevue, Washington 98008-5452 • (425) 649-7000
JAN 25 2005

REGISTERED MAIL
RR 093 786 919 US

The Honorable Gary G. Boothman
Mayor, Town of Friday Harbor
60 Second Street
P.O. Box 219
Friday Harbor, WA 98250

Dear Mayor Boothman:

Enclosed is Notice of Violation No. 1902. This Notice is issued for violations of the Town of Friday Harbor National Pollutant Discharge Elimination System (NPDES) permit. All correspondence relating to this document should be directed to the Enforcement Coordinator at Department of Ecology, Northwest Regional Office, 3190 – 160th Avenue SE, Bellevue, WA 98008-5452. If you have any questions concerning the content of the document, please call Amy Jankowiak, Municipal Enforcement Specialist at (425) 649-7195.

This Notice of Violation is issued under the authority of Chapter 90.48.120(1) of the Revised Code of Washington.

Sincerely,

Kevin C. Fitzpatrick
Water Quality Section Manager
Northwest Regional Office

Enclosure

KCF:AJ:dh

cc: Larry Altose, Ecology PIO
√ Shawn McKone, Facility Manager
Amy Jankowiak, Municipal Enforcement Specialist
David Nunnallee, Municipal Unit Supervisor
Donald A. Seeberger, Compliance & Technical Assistance Unit Supervisor
Central Files: Town of Friday Harbor; WA-0023582; WQ 6.4

DEPARTMENT OF ECOLOGY

IN THE MATTER OF THE COMPLIANCE BY)
Town of Friday Harbor) NOTICE OF VIOLATION
with Chapter 90.48 RCW and the) No. 1902
Rules and Regulations of the)
Department of Ecology)

To: The Honorable Gary G. Boothman
Mayor, Town of Friday Harbor
60 Second Street
P.O. Box 219
Friday Harbor, WA 98250

For the site located at: The Town of Friday Harbor sewage treatment plant; 375 Tucker Avenue, Friday Harbor WA

Chapter 90.48.120 of the Revised Code of Washington (RCW) reads in part: "Whenever, in the opinion of the Department, any person shall violate or create a substantial potential to violate the provisions of this chapter, or fails to control the polluting content of waste discharged, or to be discharged into any waters of the state, the Department shall notify such person of its determination by registered mail . . . ." Notice is hereby given in accordance with chapter 90.48.120(1) of the Revised Code of Washington (RCW), as follows for the location known as the Town of Friday Harbor sewage treatment plant located at 375 Tucker Avenue, Friday Harbor, Washington:

Chapter 173-220 Section 150 of the Washington Administrative Code (WAC) requires that all discharges authorized by a National Pollutant Discharge Elimination System (NPDES) permit shall be consistent with the terms and requirements of that permit....

Table 1: In June, September, October, and November of 2004, the Town of Friday Harbor violated the following effluent limits set forth in Special Condition S1 of their NPDES Permit No. WA-0023582:

DATE	MONITORING PARAMETER	PARAMETER UNITS	REPORTED VALUE	PERMIT LIMIT	
				MIN	MAX
June 2004	Chlorine, Max.	mg/L	1.53		0.75
June 2004	Fecal Coliform, GM7	#/100 ml	1500		400
June 2004	TSS % Removal, Avg.	%	77	85	
June 2004	TSS; Avg.	mg/L	47		30
June 2004	TSS; Max.	mg/L	76		45
September 2004	Fecal Coliform, GM7	#/100 ml	424		400
September 2004	TSS % Removal, Avg.	%	82	85	
September 2004	TSS; Avg.	mg/L	35		30
September 2004	TSS; Max.	mg/l	54		45
October 2004	TSS % Removal, Avg.	%	84	85	
November 2004	TSS % Removal, Avg.	%	80	85	

Notice of Violation No. 1902
Page 2 of 3

DATE	MONITORING PARAMETER	PARAMETER UNITS	REPORTED VALUE	PERMIT LIMIT	
				MIN	MAX
November 2004	TSS, Max.	mg/L	53		45
November 2004	Chlorine, Max.	mg/L	0.83		0.75

National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit No. WA-0023582 General Condition No. G1 states that "all discharges and activities authorized by this permit shall be consistent with the terms and conditions of this permit. The discharge of any pollutant more frequently than, or at a concentration in excess of, that authorized by this permit shall constitute a violation of the terms and conditions of this permit."

Special Condition No. S1A. states that, "...the permittee is authorized to discharge subject to meeting the following limitations...." The limitations for the relevant parameters are listed in Table 1.

The parameters in Table 1 demonstrate that the effluent limits listed in Special Condition S1 of the NPDES Permit for the months of June, September, October, and November 2004 have been exceeded.

Special Condition No. S3 E4 requires the submittal of a "detailed written report to the Department of Ecology within thirty days.... The report should describe the nature of the violation, corrective action taken and/or planned, steps to be taken to prevent recurrence, results of the resampling, and any other pertinent information" in the event that the Permittee is unable to comply with any of the permit terms and conditions due to any cause.

Submittals of written reports were not received for violations for the months of September through November of 2004.

This determination does not constitute an order or directive under RCW 43.21B.310.

RCW 90.48.120(1) requires that within thirty (30) days from the receipt of this Notice of Violation, the Town of Friday Harbor shall file with the Department of Ecology (Department) a full report stating:

1. What steps HAVE BEEN taken to control such waste or pollution to otherwise comply with this determination of the Department, and;

2. What steps ARE BEING taken to control such waste or pollution to otherwise comply with this determination of the Department, and;

Send the report to:

Enforcement Coordinator
Water Quality Program
Department of Ecology, Northwest Regional Office
3190 – 160th Avenue SE
Bellevue, WA 98008-5452.

Notice of Violation No. 1902
Page 3 of 3

Upon receipt of this report, the Department shall issue such order or directive as it deems appropriate under the circumstances, and shall notify the Town of Friday Harbor by registered mail.

DATED January 24, 2005 at Bellevue, Washington

Kevin C. Fitzpatrick
Water Quality Section Manager
Northwest Regional Office

TOWN OF FRIDAY HARBOR
Post Office Box 219 • Friday Harbor, Washington 98250
(360) 378-2810 • FAX: (360) 378-5339 • www.fridayharbor.org

February 17, 2005

Enforcement Coordinator
Department of Ecology
Northwest Regional Office
3190 – 160th Avenue SE
Bellevue, WA 98008-5452

Re: Town of Friday Harbor
Notice of Violation No. 1902

I am pleased to submit this report that has been prepared in response to the Department of Ecology Notice of Violation No. 1902, regarding the Town of Friday Harbor's newly constructed Wastewater Treatment Plant located at 375 Tucker Avenue. As the Notice states, various effluent limits were violated in June, September, October, and November 2004. In addition, reports required under Condition S3 E4 of the NPDES Permit #WA-0023582 were not submitted for September, October and November. The first part of this report presents a month-by-month description of the events and conditions that led to the violations, along with the steps that were taken immediately to prevent continued violations followed by a description of longer-term steps that were taken to prevent future recurrence of the problems. Finally the current status of plant operations is discussed.

Month-by-Month Discussion

Note that although multiple violations occurred in several months, they stem from a single issue: excessive solids in the effluent.

June 2004. A large quantity of seawater entered the collection system through a break in a sewer main located in the harbor. The high concentration of chloride caused a process upset, which took several days to recover from. Sludge settleability was very poor during this period. Construction debris caught in one of the SBR decanters increased the effluent solids further by allowing mixed liquor to leak into the effluent pipeline during aeration phases. Disinfection by UV was hampered by the presence of solids and further affected by improper calibration of the effluent flow meter. This led to the fecal coliform violation. Sodium hypochlorite disinfection was started in place of UV during the high solids event. However, the high concentration of solids and an improperly calibrated flow meter made it difficult to control the dosage to a level

that provided adequate disinfection without exceeding the maximum chlorine limit.

Actions Taken: The broken submarine sewer main was located and repaired. The SBR decanters were inspected and the debris was removed. Field technicians recalibrated the effluent flow meter. These actions resulted in significant improvements in effluent quality; no violations were reported in July or August our months of highest plant loading.

Further Actions: Although sludge settleability was improved, it was not as good as we expected for the new plant. Process evaluations were begun by the plant designers to determine the cause and to make further process improvements.

September 2004. Filamentous organisms continued to increase, causing sludge settleability to worsen. A fraction of the sludge tended to float. In Friday Harbor, the organic loading drops significantly in the fall as the number of seasonal visitors drops off. These changes appeared to exacerbate the sludge settleability problem. As a result, violations in TSS occurred. The high concentration of solids in the effluent hampered the effectiveness of the UV disinfection, resulting in a fecal coliform violation.

Actions Taken: Sodium hypochlorite solution was injected into the SBR basins to reduce filament growth. SBR cycle times were adjusted to discourage filament growth.

Further Actions: Process evaluations continued. Various remedies were being considered to help control filaments, including addition of polymer and changing the approach in selecting a mean cell residence time in the secondary treatment process.

October 2004. In general, effluent quality had improved; however, floating sludge continued to be present. Although no specific TSS concentration violations were reported, the higher concentration of solids in the effluent resulted in a violation of the 85 percent removal rule.

Actions Taken: Adjustments were made to the SBR cycle times to optimize the sludge quality and discourage the growth of filaments.

Further Actions: Through further evaluation of the secondary treatment process it was discovered that there is a correlation between sludge settling quality and sludge dewatering/drying days. On days during which sludge is processed, the settleability of the sludge decreases. Sampling indicated an elevated level of ammonia (up to 40 mg/L) in the combined influent and recycle streams. We concluded that the widely varying ammonia concentration entering the SBR affects the process and has played a major role in causing the sludge settleability problem. The source of the ammonia is the aerobic digester. The ammonia does not become oxidized to nitrate because alkalinity is consumed. By cycling

the digester blower on and off, denitrification will occur, contributing alkalinity back to the digester for nitrification to take place. In accordance with this recommendation, controls will be installed on the digester blowers to provide this mode of operation.

November 2004. On November 4, 2004, a control card in the PLC for the SBR failed, rendering the controls inoperative for several hours. This failure affected the secondary treatment process, causing a higher solids concentration in the effluent. It was also discovered that denitrification was occurring in the SBR during the Settle phase causing sludge bulking. These events led to violations in TSS Max and TSS Percent Removal. In late November, disinfection was switched to sodium hypochlorite because the control system for the UV disinfection system was found to be working improperly. During the switchover, the hypochlorite dosage was set too high. Although it was later adjusted downward, the corrective action was inadequate to avoid a Chlorine Max violation.

Actions Taken: The defective card in the PLC was replaced and the SBR vendor was contacted for immediate assistance in re-starting the system. Process parameters were adjusted to eliminate the denitrification during settling. Specifically, aeration on-off times were adjusted to force denitrification to occur during the React phase so that it would not occur during the Settle phase. The UV equipment vendor was contacted to repair the control system.

Further Actions: The plant staff is continuing to arrange with local contractors for installation of controls for the digester blowers to reduce ammonia in solids processing recycle stream. The staff has also arranged to have computer modeling of the SBR system performed to give guidance on making the proper adjustments for different conditions. The UV disinfection system vendor will be contacted to visit the plant again to make necessary adjustments and repairs to the UV control system.

Current Status

Effluent quality has remained good since the denitrification issue was resolved by adjusting the aeration settings in November. However, the sludge SVI remains higher on solids processing days. This could lead to degradation of the effluent during high flow periods when less time is available for the settling phase during each cycle of the SBR. The digester blower controls described previously are currently being installed and are expected to be operational by the end of February. This is expected to resolve the remaining sludge quality issue, which, in turn, will result in a more consistent effluent quality.

The problems with the UV disinfection system controls were resolved February 1, 2005. Errors were found in the original programming and calibration that were performed during the initial installation. The system is now operating properly.

Pertaining to the issue of fecal coliform violations, the staff has recently discovered that some elevated coliform counts are caused by the accumulation of solids in the effluent channel. This was exacerbated when incidents of high effluent TSS occurred. To resolve this issue, the effluent channel will be flushed on a regular basis and accumulated solids returned to the treatment plant. This procedure is now adopted as part of the routine scheduled plant maintenance.

The plant staff is currently collecting data to be used for the computer modeling effort. Modeling should be completed within a few months. The modeling will give the plant operators more guidance in making appropriate adjustments to the process when conditions such as organic loading, flow, and temperature change with the seasons.

Conclusion

Most of the permit violations in the past few months have stemmed from a combination of factors, including mechanical problems and installation issues with new equipment, process upset from influx of seawater, changes brought on by the new solids handling process, and difficulties in determining appropriate settings for process variables in a very flexible, new secondary treatment system. Although the flexibility provides numerous advantages in allowing the system to handle widely varying conditions, significant operator training and experience are necessary to take full advantage of this flexibility. Training provided by the SBR vendors was rather basic. The Town staff sought additional troubleshooting assistance and training from Brown and Caldwell Engineers, and are now much more comfortable with the system. Additional training will be provided through the SBR computer modeling project. Most of the technical and mechanical issues have been resolved, and the problem with ammonia in the solids handling recycle stream will be resolved shortly.

My staff and I believe that with the efforts to date and the additional steps currently planned that the problems that have led to most of the recent violations will be resolved. Please feel free to contact Don Reitan, Plant Supervisor at (360) 378-5400 to discuss any questions or other suggestions you may have.

Sincerely,

Gary G. Boothman, Mayor

c: C. King Fitch, Town Administrator
Mike Wilks, Utilities Superintendent
Don Reitan, Wastewater Dept.
Jon Beer, Brown & Caldwell

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Northwest Regional Office • 3190 160th Avenue SE • Bellevue, Washington 98008-5452 • (425) 649-7000

MAR 0 4 2005

REGISTERED MAIL
RR 093 786 940 US

Mr. C. King Fitch
Town Administrator
Town of Friday Harbor
P.O. Box 219
Friday Harbor, WA 98250

Dear Mr. Fitch:

This letter is being sent as a follow-up to Notice of Violation No. 1902. The Department of Ecology (Ecology) is requesting that the Town of Friday Harbor submit a brief summary report on a monthly basis (until further notice) updating Ecology on the status of actions discussed in the response to NOV letter dated February 17, 2005. It is requested that the updates be submitted separately from the Discharge Monitoring Reports, but also due by the 15th of each month. It is requested that the first submittal cover the months of February 2005 (following the date of the response letter) and March 2005, and be submitted by April 15, 2005. The topics for update should include but are not limited to the following:

1. Findings of any inspections of the submarine line that runs under the ferry terminal along with documenting any necessary repair activities
2. Sludge settleability—process evaluations and process improvements
3. Filamentous organism management/SBR cycle times
4. Sludge dewatering/drying and sludge quality
5. UV system/flow meter functionality
6. Chlorine usage
7. Computer system modeling of the SBR system
8. Effluent channel cleaning
9. Operator training

Mr. C. King Fitch
March 4, 2005
Page 2 of 2

In addition, whenever significant operational and system changes and updates are made, it is necessary to update the Operations and Maintenance Manual. Please update the manual to reflect changes as they occur and submit changes to Ecology within 30 days of the date the manual is changed.

All submittals listed in this letter should be sent to Amy Jankowiak at Department of Ecology, Northwest Regional Office, 3190 – 160th Avenue SE, Bellevue, WA 98008-5452 (no cc's to other Ecology staff necessary).

If you have any questions concerning the content of the document, please call Shawn McKone, Permit Manager at (425) 649-7037 or me at (425) 649-7195.

Sincerely,

Amy Jankowiak
Municipal Compliance Specialist
Water Quality Program
Northwest Regional Office

AJ:dh

cc: Don Reitan, Plant Supervisor
Mike Wilks, Utilities Superintendent
Jon Beer, Brown & Caldwell
Shawn McKone, Facility Manager
David Nunnallee, Municipal Unit Supervisor
Central Files: Town of Friday Harbor; WA-0023582; WQ 6.4

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Northwest Regional Office • 3190 160th Avenue SE • Bellevue, Washington 98008-5452 • (425) 649-7000

SEP 22 2005

REGISTERED MAIL
RB 336 144 367 US

The Honorable Gary G. Boothman
Mayor, Town of Friday Harbor
60 Second Street
PO Box 219
Friday Harbor, WA 98250

Dear Mayor Boothman:

Enclosed is a copy of the signed and effective Agreed Order No. 2746. The enclosed Order may not be appealed. The Order Amendment is effective as of September 22, 2005.

If you have any questions concerning the content of the document, please contact Amy Jankowiak at (425) 649-7195 or write, Department of Ecology Northwest Regional Office, 3190 - 160th Avenue SE, Bellevue, Washington 98008-5452 .

Sincerely,

Kevin C. Fitzpatrick
Water Quality Section Manager
Northwest Regional Office

KCF:AJ:ct

Enclosure

cc: C. King Fitch, Town Administrator
Larry Altose, Ecology PIO
Shawn McKone, Facility Manager, Ecology
Amy Jankowiak, Municipal Compliance Specialist, Ecology
Dave Nunnallee, Municipal Unit Supervisor, Ecology
Donald A. Seeberger, Compliance & Technical Assistance Unit Supervisor, Ecology
Central Files: Town of Friday Harbor STP; WA-0023582; WQ 6.4

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

IN THE MATTER OF COMPLIANCE BY Town of Friday Harbor	)))	AGREED ORDER No. 2746

To: The Honorable Gary G. Boothman
Mayor, Town of Friday Harbor
60 Second Street
PO Box 219
Friday Harbor, WA 98250

For the site located at: The Town of Friday Harbor sewage treatment plant (375 Tucker Avenue, Friday Harbor) and the Town of Friday Harbor collection system

I. INTRODUCTION

This is an Agreed Order between the Department of Ecology (Ecology) and the Town of Friday Harbor to achieve compliance with Chapter 90.48 Revised Code of Washington (RCW) and Chapters 173-221 and 173-220 Washington Administrative Code (WAC) by taking certain actions which are described below for improvements at the Friday Harbor sewage treatment plant and collection system.

I. RECOGNITION OF THE DEPARTMENT'S JURISDICTION

This Agreed Order is issued pursuant to the authority vested in the Department by the Federal Water Pollution Control Act (FWPCA), 33 U.S.C. sec 1311, et seq. and by Chapter 90.48 RCW.

RCW 90.48.030 provides that the Department shall have the jurisdiction to control and prevent the pollution of streams, lakes, rivers, ponds, inland waters, salt waters, water courses, other surface and underground waters of the state of Washington.

RCW 90.48.120(2) authorizes the Department to issue administrative orders requiring compliance whenever it determines that a person has violated or created a substantial potential to violate any provision of Chapter 90.48 RCW or fails to control the polluting content of waste to be discharged to waters of the state.

The Town of Friday Harbor agrees to undertake all actions required of it by the terms and conditions of this Agreed Order and not to contest the Department's jurisdiction and authority to administer this Agreed Order.

Nothing in this Agreed Order shall in any way relieve the Town of Friday Harbor of its obligations to comply with the requirements of its NPDES Permit. Neither shall anything in this Agreed Order limit the Department's authority to enforce the provisions of the aforementioned permit.

II. FACTS REGARDING THIS CASE

The Department's determination that a violation has occurred or is about to occur is based on the following facts:

The Town of Friday Harbor's submarine line has had numerous breaks and leaks over the last 10 years. Most recently, there were 3 separate breaks in the line:

- On March 1, 2005, approximately 20,000 gallons of sewage was discharged into Friday Harbor as a result of the submarine line needing to be cut and repaired. The need for the repair was precipitated by the lack of support under the sewer line. Sediments under the line had been displaced either by prop wash from the ferries or nearby pile driving or a combination of both.
- On May 24, 2005, approximately 24,000 gallons of sewage was discharged into Friday Harbor. Repairs were made. The Town of Friday Harbor suspects the cause to be damage from a boat moored where it should not have been.
- On May 25, 2005, approximately 72,000 gallons of sewage was discharged into Friday Harbor. Repairs were made. The cause of the break appears to be a result of badly deteriorated pipes.

As these breaks occur, saltwater intrusion typically occurs and is likely the cause of problems to the plant. Many, but not all, of the effluent violations at the plant are related to the salt water intrusion.

In addition, the plant has experienced increased salinity levels in the influent in the recent months. This increased salinity may be contributing to recent poor plant performance. At present, the cause of the salinity increase is unknown, however, it is suspected to be the result of minor leaks in the submarine line.

National Pollutant Discharge Elimination System (NPDES) Permit No. WA-0023582 authorizes the discharge of municipal wastewater at the permitted location only (the outfall) and subject to effluent limitations. The discharge of raw sewage into Friday Harbor is unauthorized.

A Notice of Violation was issued to the Town of Friday Harbor on January 25, 2005, for effluent violations from the wastewater treatment plant covering the period of June 2004 through November 2004. A response to the NOV was received and a follow-up letter was sent requesting the submittal of summary reports on the status of actions discussed in the response due monthly. Reports have been submitted as requested. Since then violations have continued on and off at the plant. The violations are caused by either the salt water intrusions from the submarine breaks and/or operation problems at the treatment plant. The following table includes violations since the notice of violation.

Agreed Order No. 2746
Town of Friday Harbor
Page 3 of 5

Table 1: Violations of the effluent limits set forth in Special Condition S1 of the NPDES Permit No. WA-0023582 for the period of December 2004 through July 2005.

DATE	MONITORING PARAMETER	PARAMETER UNITS	REPORTED VALUE	MIN LIMIT	MAX LIMIT
January 2005	Fecal Coliform, GEM	#/100 ML	206		200
January 2005	Total Suspended Solids, MAX	MG/L	49		45
May 2005	Fecal Coliform, GM7	#/100 ML	4500		400
May 2005	TSS % Removal, AVG	PERCENT	71	85	
May 2005	TSS, AVG	LBS/DAY	215		168
May 2005	TSS, AVW	LBS/DAY	762		251
May 2005	TSS, AVG	MG/L	67		30
May 2005	TSS, MAX	MG/L	201		45
June 2005	Total Residual Chlorine, AVG	MG/L	0.54		0.5
June 2005	Total Residual Chlorine, MAX	MG/L	2.01		0.75
June 2005	Fecal Coliform, GEM	#/100 ML	215		200
June 2005	Fecal Coliform, GM7	#/100 ML	5000		400
June 2005	TSS % Removal, AVG	PERCENT	84	85	
June 2005	TSS, AVG	MG/L	41		30
June 2005	TSS, MAX	MG/L	67		45
July 2005	TSS % Removal, AVG	PERCENT	79	85	
July 2005	TSS, AVG	MG/L	66		30
July 2005	TSS, AVW	MG/L	113		45
July 2005	Total Residual Chlorine, AVG	MG/L	0.67		0.5
July 2005	Total Residual Chlorine, MAX	MG/L	1.13		0.75

IV. ACTIONS TO IMPROVE PERMIT COMPLIANCE

In accordance with RCW 90.48.120(2) IT IS AGREED, that the Town of Friday Harbor shall take the following actions and not contest the Department's jurisdiction and authority to administer this Agreed Order. These actions are necessary to satisfy the requirements of Chapters 173-220 and 173-221 WAC. The Town of Friday Harbor has participated in defining these actions and the schedule by which they shall be completed.

1) Complete the plant computer modeling and analysis project by October 15, 2005.
2) Conduct monitoring of the entire submarine line by either dye testing, salinity monitoring, or other means for the purpose of locating any leaks or breaks by November 1, 2005.
3) Install an online salinity meter at the headworks of the Friday Harbor wastewater treatment plant to monitor salinity coming into the plant. The salinity meter shall be connected to the SCADA system and alarm. The installations shall be completed by November 30, 2005.
4) Post signs by December 31, 2005, at or near the location of the submarine line indicting the fact that the line is there and/or a warning not to get too close to the line.

5) Conduct a visual inspection of exposed sections (areas not buried in sediment) of the submarine line by December 31, 2005. The initial inspection may be conducted by personnel in boats or on shore in areas where visibility permits adequate assessment of the condition of the pipeline. Divers shall be used in the initial inspection of areas where visibility is obscured or above-water examination is inconclusive. After the initial inspection, conduct visual inspections during low tide, of the entire submarine line that can be seen without the use of divers at least once per quarter (beginning January - March 2006; ...) until written approval to cease the inspections; for the purpose of identifying any breaks, leaks, problems with alignment or line movement, or other potential areas of concern.

6) Complete any immediate and necessary repairs and shoring up to the line based on the visual inspections required above or by any other means of discovery of problems within 10 days of discovery for critical areas (for actual breaks or locations with potential for imminent breaks) and within 30 days of discovery for other repairs. The 10-day time period may be exceeded only for special circumstances detailed in a written request to Ecology and approval for an extension. This procedure may be done by e-mail through either Ecology's Facility Manager or Municipal Compliance Specialist.

7) Submit a preliminary review of rehabilitation options for the submarine line by December 31, 2005. The review of options should include at least 3 options, at least one of which should be an option of moving the submarine pipe onto land.

8) Submit an evaluation of treatment plant staffing levels and experience to Ecology by March 1, 2006.

9) Submit a draft engineering report or facility plan to the Department to identify the most cost effective plan for improving the collection system by May 1, 2006. The plan shall include a competitive evaluation of the alternatives identified in item 7 along with any other alternatives identified after the due date for item 7. Alternative comparisons shall also include an evaluation of the environmental consequences (benefit or detriment) of each alternative. (For purposes of eligibility for future funding considerations, the plan shall include a SEPA checklist [State and Federal funding] and SERP checklist [Federal funding only]).

10) A final, revised engineering report or facility plan and construction plans and specifications shall be submitted to the Department for approval by August 31, 2006 (the timeline in item 9 and item 10 is driven by the assumption of the Town seeking SRF [Federally-backed] and/or Centennial [State-backed] funding for the 2007 FY). A proposed construction schedule shall also be submitted with the final engineering report of facility plan. This Agreed Order will then be amended to include the construction schedule.

11) Continue to seek assistance from consultants, technicians and Ecology for improved operation of the wastewater plant as well as seeking advice from other municipalities with SBR experience.

V. PROGRESS REPORTING

The Town of Friday Harbor shall provide progress reports to the Department within 30 days of the completion of each of the items listed in the Compliance Schedule in Section IV.

The Town of Friday Harbor shall immediately notify the Department of any occurrence which may result in noncompliance with the requirements of this Agreed Order. Such notification shall state the nature of the potential noncompliance, the reason(s) therefore and the actions taken by the Town of Friday Harbor to address the potential noncompliance.

VI. AMENDMENTS TO THE AGREED SCOPE OF WORK AND SCHEDULE

Amendments to the agreed scope of work and schedule may be requested for good cause. Extension of deadlines imposed by this Agreed Order shall be granted only when requests for extensions are submitted in writing and in a timely fashion, and good cause exists for granting the extension. Failure to obtain financial assistance in the form of grants or loans shall not be considered good cause.

To be effective, all proposed amendments must be signed by the person with signature authority for each party and attached to this Agreed Order.

VII. EFFECTIVE DATE

This Agreed Order is effective on the date the agreement has been signed by both parties.

VIII. TERMINATION OF THE AGREED ORDER

Upon completion by the Town of Friday Harbor of the actions identified in Section IV of this Agreed Order and issuance of a Notice of Compliance by Department, the requirements of this Agreed Order shall be deemed to be fulfilled and shall have no further effect on the Town of Friday Harbor.

IX. ENFORCEMENT

Failure to comply with this Agreed Order may result in the issuance of civil penalties of up to $10,000 per day or other actions, whether administrative or judicial, to enforce the terms of this Agreed Order.

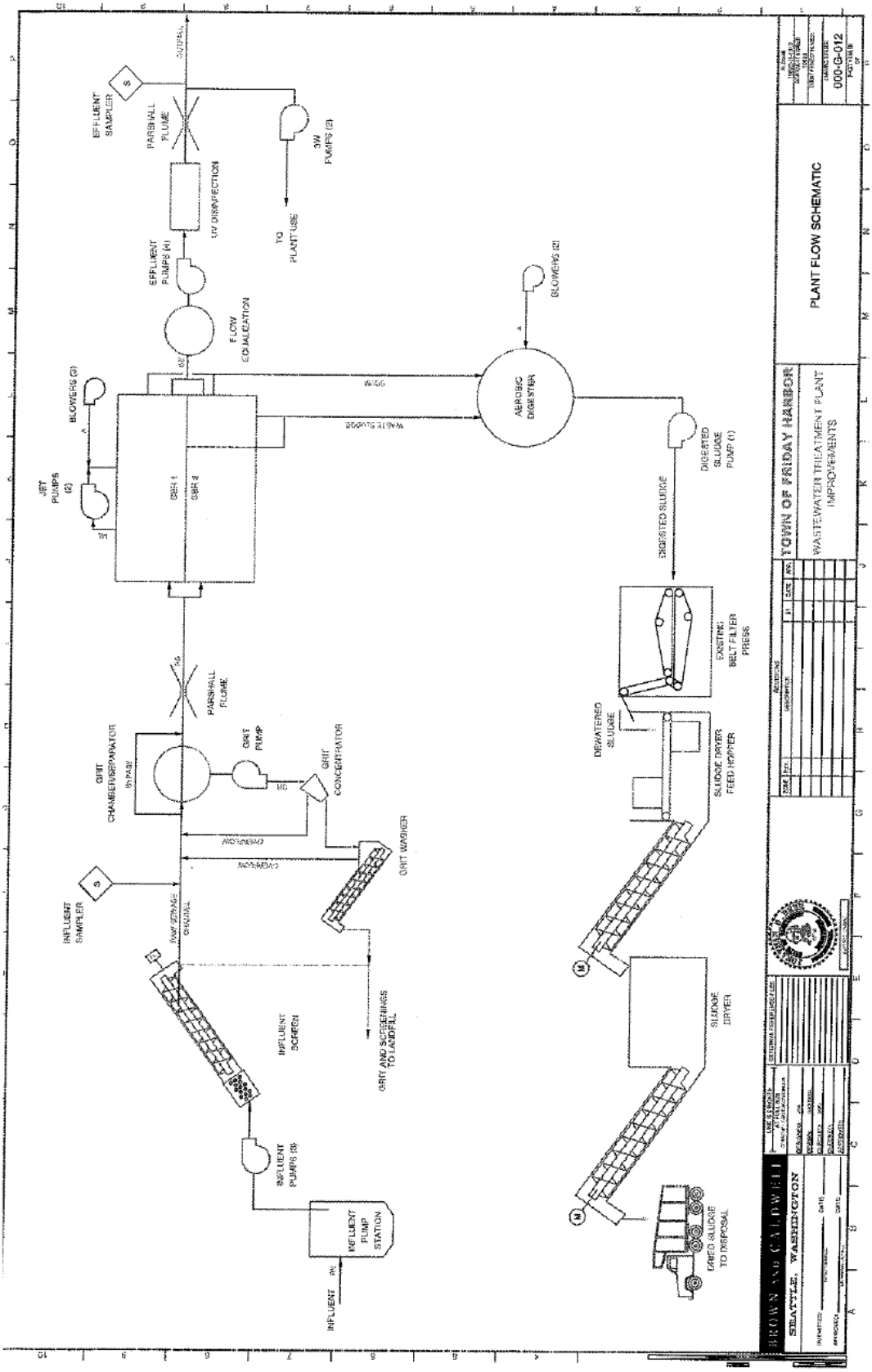
Gary Boothman — September 15th, 2005

The Honorable Gary G. Boothman
Mayor, Town of Friday Harbor

Kevin C. Fitzpatrick — September 22, 2005

Kevin C. Fitzpatrick
Water Quality Section Manager
Northwest Regional Office
Department of Ecology

APPENDIX F—PROCESS DIAGRAM



APPENDIX G—DMR SUMMARY DATA

The following table and graphs summarize data reported to the Department in monthly Discharge Monitoring Reports from August 2000 to October 2005 for the Friday Harbor Wastewater Treatment Plant.

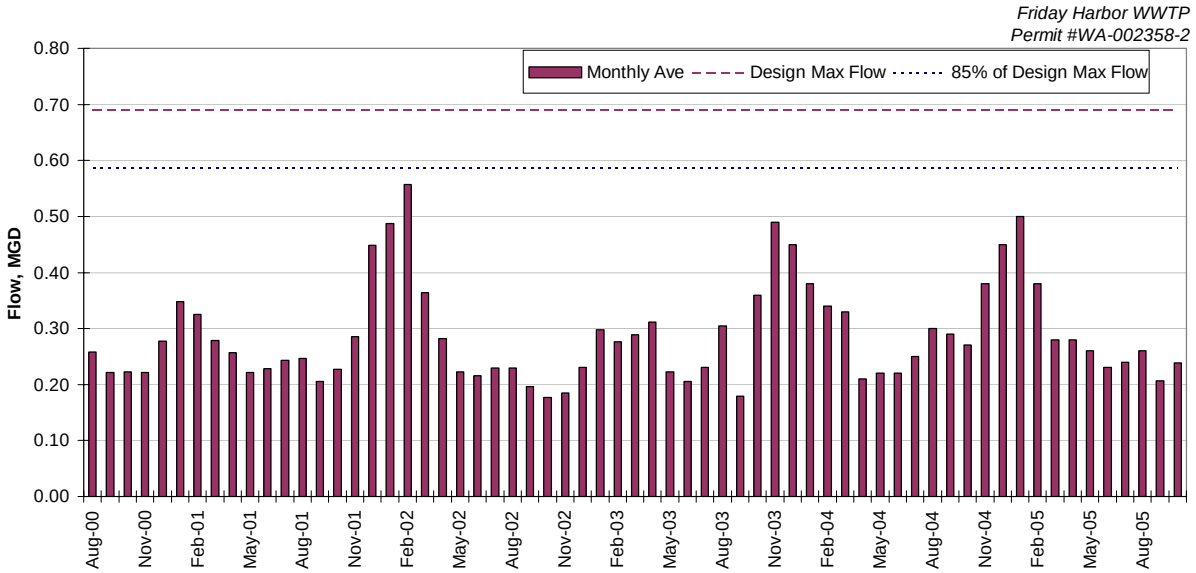
Discharge Monitoring Data, 2000-2005

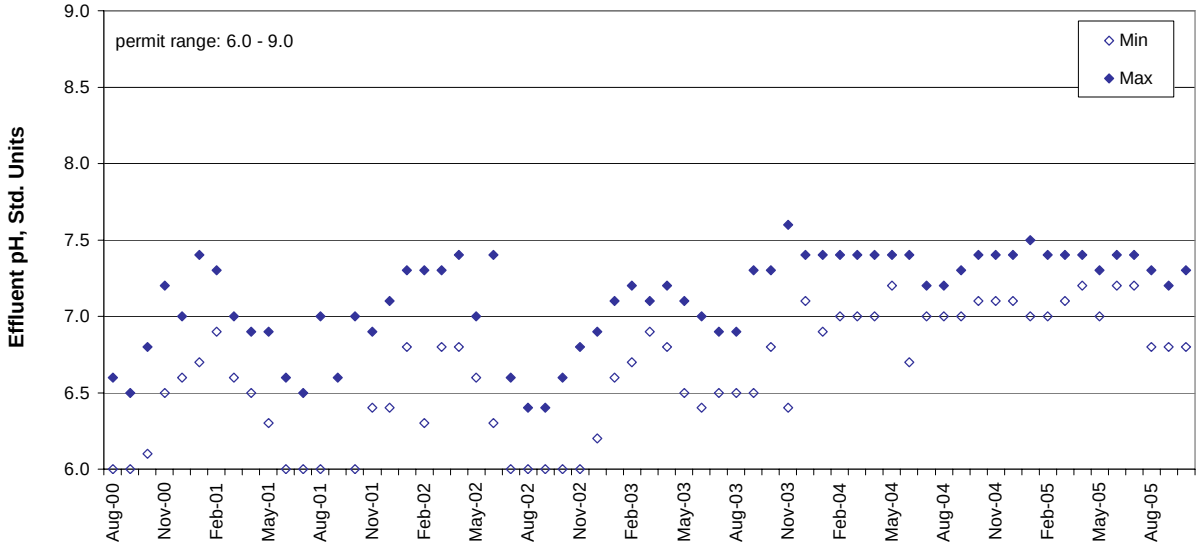
Facility: Friday Harbor WWTP
Permit No: WA-002358-2

	Influent								Effluent																					
Date	BOD, mg/L	BOD, mg/L	BOD, ppd	BOD, ppd	TSS, mg/L	TSS, mg/L	TSS, ppd	TSS, ppd	Flow, MGD	Flow, MGD	BOD, mg/L	BOD, mg/L	BOD, ppd	BOD, ppd	BOD, % Removal	TSS, mg/L	TSS, mg/L	TSS, ppd	TSS, ppd	TSS, % Removal	PH	PH	Fecal Coliform, #/100 ml	Fecal Coliform, #/100 ml	Chlorine, mg/L	Chlorine, mg/L	Chlorine, ppd
	Monthly Ave	Monthly Max	Monthly Ave	Monthly Max	Monthly Ave	Monthly Max	Monthly Ave	Monthly Max	Monthly Ave	Monthly Max	Monthly Ave	Wkly Ave	Monthly Ave	Wkly Ave	Ave	Monthly Ave	Wkly Ave	Monthly Ave	Wkly Ave	Ave	Min	Max	GEM	GM7	Monthly Ave	Monthly Max	Monthly Ave
August-00	432	690	884	1,435	218	288	446	556	0.258	0.338	8	11	16	22	98	10	14	21	28	95	6.00	6.60	52	122	0.39	0.64	0.9
September-00	361	421	614	730	188	212	321	371	0.221	0.288	15	19	25	30	96	19	23	33	36	90	6.00	6.50	75	165	0.50	0.63	0.9
October-00	348	383	611	832	172	198	305	452	0.222	0.364	13	17	20	26	97	13	17	22	27	93	6.10	6.80	78	121	0.44	0.54	0.8
November-00	301	420	580	797	181	272	352	516	0.221	0.325	14	21	27	51	95	16	25	31	61	91	6.50	7.20	22	63	0.39	0.50	0.7
December-00	263	400	555	791	143	200	301	367	0.277	0.482	14	16	30	38	95	15	19	33	46	89	6.60	7.00	42	63	0.50	0.62	0.7
January-01	232	285	638	785	123	162	335	368	0.348	0.594	19	25	52	67	92	18	25	51	79	85	6.70	7.40	18	39	0.46	0.64	1.4
February-01	242	280	624	764	136	162	349	409	0.325	0.418	17	23	44	65	93	20	28	51	77	86	6.90	7.30	15	49	0.45	0.67	1.2
March-01	215	308	483	655	142	152	323	394	0.278	0.352	16	23	37	56	92	20	30	47	74	86	6.60	7.00	21	60	0.45	0.50	1.1
April-01	228	283	481	625	139	184	296	478	0.257	0.337	26	**48**	56	105	89	29	**49**	63	108	**79**	6.50	6.90	26	367	0.40	0.63	0.8
May-01	299	365	533	730	167	190	298	356	0.221	0.317	14	19	25	35	95	9	12	17	21	94	6.30	6.90	20	28	0.48	0.58	0.9
June-01	323	390	576	731	192	290	344	530	0.228	0.296	12	14	22	25	96	12	14	22	24	94	6.00	6.60	11	117	0.42	0.65	0.8
July-01	329	420	616	713	202	228	382	457	0.243	0.310	10	13	19	25	97	16	28	29	52	92	6.00	6.50	32	122	0.48	0.72	1.0
August-01	355	439	708	898	207	270	411	528	0.246	0.327	15	28	31	57	96	16	25	31	52	92	6.00	7.00	114	379	**0.53**	**0.79**	1.0
September-01	288	374	457	654	175	200	274	351	0.205	0.282	17	26	27	41	94	20	26	31	44	89	**5.90**	6.60	97	329	0.44	0.61	0.8
October-01	256	334	480	660	165	242	312	478	0.227	0.342	7	10	14	20	97	11	17	21	28	93	6.00	7.00	26	75	0.50	0.57	0.9
November-01	236	343	538	645	153	220	365	623	0.285	0.533	10	12	24	39	96	12	14	30	41	92	6.40	6.90	31	190	0.48	0.68	0.9
December-01	134	205	474	658	77	94	285	431	0.449	0.918	12	18	53	124	91	12	18	52	124	85	6.40	7.10	16	31	0.46	0.56	1.9
January-02	118	165	449	689	76	122	285	509	0.487	0.919	15	16	55	68	87	11	15	42	47	85	6.80	7.30	14	44	0.31	0.38	1.3
February-02	122	165	524	688	95	124	432	712	0.557	0.914	13	15	57	87	90	12	18	57	99	88	6.30	7.30	4	10	0.44	0.62	2.2
March-02	164	238	479	822	96	168	283	580	0.364	0.538	16	25	46	63	90	18	31	52	85	**81**	6.80	7.30	1	15	0.49	0.74	1.5
April-02	238	325	508	735	151	244	329	511	0.282	0.404	18	19	39	48	93	17	25	38	50	89	6.80	7.40	9	192	0.35	0.51	0.8
May-02	253	298	446	552	146	180	259	333	0.223	0.286	12	16	21	29	95	12	16	21	26	92	6.60	7.00	7	10	0.37	0.59	0.7
June-02	316	476	531	814	160	226	270	362	0.216	0.289	15	28	25	46	95	16	29	26	49	90	6.30	7.40	45	134	0.24	0.28	0.4
July-02	326	409	580	731	174	210	312	406	0.229	0.290	8	17	14	30	97	10	15	18	26	94	6.00	6.60	16	71	0.36	0.66	0.7
August-02	332	379	599	667	181	202	327	373	0.229	0.303	10	14	18	25	97	12	13	21	22	94	6.00	6.40	9	31	0.48	0.58	0.9
September-02	354	458	532	742	183	274	275	484	0.196	0.270	8	14	12	22	98	13	18	20	27	93	6.00	6.40	49	374	0.47	0.51	0.8
October-02	361	465	516	901	172	210	246	438	0.177	0.257	8	11	12	15	98	13	18	18	24	93	6.00	6.60	72	218	0.35	0.43	0.5
November-02	282	360	392	568	157	170	218	257	0.185	0.270	16	21	22	30	94	19	24	27	35	88	6.00	6.80	23	242	0.40	0.63	0.6
December-02	266	375	468	675	166	188	305	404	0.230	0.407	17	24	29	39	94	24	29	44	52	86	6.20	6.90	16	43	0.39	0.51	0.7
January-03	268	416	662	1,054	125	154	302	416	0.298	0.570	7	8	17	22	97	11	13	28	40	91	6.60	7.10	3	24	0.48	0.56	1.2
February-03	197	296	425	591	118	142	256	340	0.276	0.377	9	13	19	28	96	11	20	24	43	91	6.70	7.20	9	60	0.38	0.49	0.9
March-03	155	294	371	616	104	120	252	335	0.289	0.449	9	13	22	32	94	14	20	34	50	86	6.90	7.10	5	9	0.43	0.54	1.0
April-03	153	183	387	528	113	146	287	363	0.312	0.469	8	9	19	20	95	10	14	25	28	91	6.80	7.20	18	31	0.31	0.32	0.8
May-03	210	235	363	436	145	194	252	358	0.223	0.282	7	8	13	14	97	9	13	15	22	94	6.50	7.10	61	150	0.24	0.27	0.4
June-03	253	354	425	617	205	368	346	614	0.205	0.253	8	11	14	19	97	11	14	19	25	95	6.40	7.00	45	85	0.24	0.35	0.4
July-03	245	304	472	578	154	254	307	544	0.230	0.350	15	23	28	37	94	26	41	54	105	**83**	6.50	6.90	64	**469**	0.26	0.30	0.5
August-03	163	260	383	489	169	256	415	745	0.305	0.408	19	30	48	79	88	25	29	62	77	85	6.50	6.90	133	184	0.18	0.22	0.5
September-03	264	383	340	476	217	464	281	600	0.179	0.321	13	14	17	20	95	21	24	27	32	90	6.50	7.30	49	343	0.47	**0.88**	0.7
October-03	205	279	477	729	173	234	396	490	0.360	1.270	9	13	22	40	96	18	28	43	80	90	6.80	7.30	49	174	0.34	0.48	0.9
November-03	124	255	383	514	136	242	408	548	0.490	1.760	4	7	15	21	97	8	14	28	39	94	6.40	7.60	30	92	0.13	0.18	0.5
December-03	106	164	391	576	103	154	396	514	0.450	0.620	6	9	24	37	94	15	25	58	83	85	7.10	7.40	89	179	0.00	0.03	0.0
January-04	127	171	390	480	124	204	377	527	0.380	0.760	13	27	39	83	90	**32**	**61**	103	199	**74**	6.90	7.40	75	387	0.00	0.00	0.0
February-04	131	240	351	660	138	274	385	937	0.340	0.430	6	7	16	23	96	27	42	74	113	**80**	7.00	7.40	117	**465**	0.00	0.00	0.0
March-04	137	207	346	450	140	186	368	558	0.330	0.540	6	9	16	19	96	30	**60**	64	244	**79**	7.00	7.40	65	**592**	0.00	0.00	0.0
April-04	246	304	400	510	189	210	308	372	0.210	0.270	14	19	24	33	94	29	34	48	66	85	7.00	7.40	172	248	0.00	0.00	0.0
May-04	256	342	432	513	214	248	371	545	0.220	0.350	11	15	20	23	96	25	34	43	75	88	7.20	7.40	138	274	0.00	0.00	0.0
June-04	281	349	506	609	203	260	389	802	0.220	0.370	20	32	37	63	93	**47**	**76**	91	126	**77**	6.70	7.40	136	**1500**	0.36	**1.53**	0.6
July-04	343	443	714	803	230	254	485	554	0.250	0.310	7	10	13	20	98	11	16	23	34	95	7.00	7.20	14	68	0.00	0.01	0.0
August-04	321	390	742	992	217	308	510	692	0.300	0.610	5	8	13	29	99	10	17	29	63	95	7.00	7.20	31	222	0.00	0.00	0.0
September-04	283	415	626	865	190	280	437	651	0.290	0.410	13	22	28	42	95	**35**	**54**	79	103	**82**	7.00	7.30	142	**424**	0.01	0.05	0.0
October-04	235	330	500	788	154	218	338	455	0.270	0.420	8	12	18	28	97	25	37	59	105	**84**	7.10	7.40	36	97	0.00	0.00	0.0
November-04	144	194	445	743	143	194	426	540	0.380	0.730	11	14	32	42	93	28	**53**	85	162	**80**	7.10	7.40	85	212	0.29	**0.83**	1.3
December-04	109	160	373	560	118	150	416	583	0.450	0.860	6	8	20	28	95	14	22	51	75	88	7.10	7.40	76	282	0.49	0.64	1.7
January-05	124	195	450	732	147	246	535	923	0.500	1.080	8	15	32	76	93	23	**49**	92	249	85	7.00	7.50	**206**	366	0.20	0.75	1.7
February-05	159	233	473	583	181	252	579	1,206	0.380	0.640	8	10	23	27	95	17	28	49	57	91	7.00	7.40	127	374	0.04	0.10	0.2
March-05	211	315	489	657	157	230	369	556	0.280	0.370	8	12	18	25	96	14	20	32	41	91	7.10	7.40	174	276	0.00	0.00	0.0
April-05	222	260	507	681	152	200	349	502	0.280	0.330	8	11	18	22	96	23	27	52	57	85	7.20	7.40	75	194	0.00	0.00	0.0
May-05	284	345	658	852	201	280	490	1,060	0.260	0.480	21	42	21	144	92	**67**	**201**	**215**	**762**	**71**	7.00	7.30	189	**4500**	0.30	0.75	0.8
June-05	339	405	760	1,089	225	282	506	661	0.231	0.299	16	32	29	62	96	**41**	**67**	75	139	**84**	7.20	7.40	**215**	**5000**	**0.54**	**2.01**	1.1
July-05	376	630	724	1,518	309	700	587	1,374	0.240	0.290	12	16	22	29	97	**66**	**113**	120	194	**79**	7.20	7.40	41	210	**0.67**	**1.13**	0.8
August-05	372	480	800	1,195	219	266	477	623	0.260	0.370	8	14	18	29	98	26	32	55	71	88	6.80	7.30	66	193	0.33	0.42	0.7
September-05	317	420	558	806	181	222	318	500	0.206	0.363	9	14	16	20	97	27	39	46	59	85	6.80	7.20	12	25	0.41	0.49	0.7
October-05	275	383	541	866	177	274	359	604	0.239	0.462	6	8	11	12	98	8	9	15	24	96	6.80	7.30	18	154	0.42	0.49	0.7
since 4/00: AVE:	248	335	520	728	164	228	357	542	0.286	0.474	12	17	26	41	95	20	31	46	81	88	6.6	7.1	59	342	0.32	0.49	0.73
MIN:	106	160	340	436	76	94	218	257	0.177	0.253	4	7	11	12	87	8	9	15	21	71	5.9	6.4	1	9	0.00	0.00	0.00
MAX:	432	690	884	1518	309	700	587	1374	0.557	1.760	26	48	57	144	99	67	201	215	762	96	7.2	7.6	215	5000	0.67	2.01	2.20
LIMIT:			1,360				944		0.587		30	45	168	251	85	30	45	168	251	85	6.0	9.0	200	400	0.500	0.75	2.80
DESIGN:			1,600				1,110		0.690																		

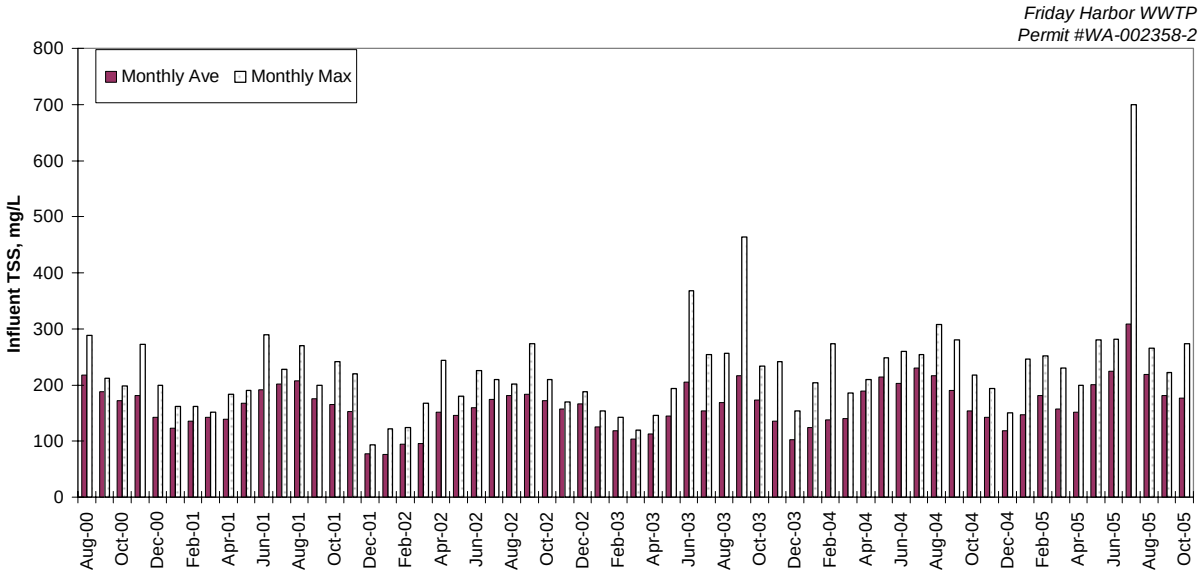
approaching design limits (85%)
exceeds permit/design limits

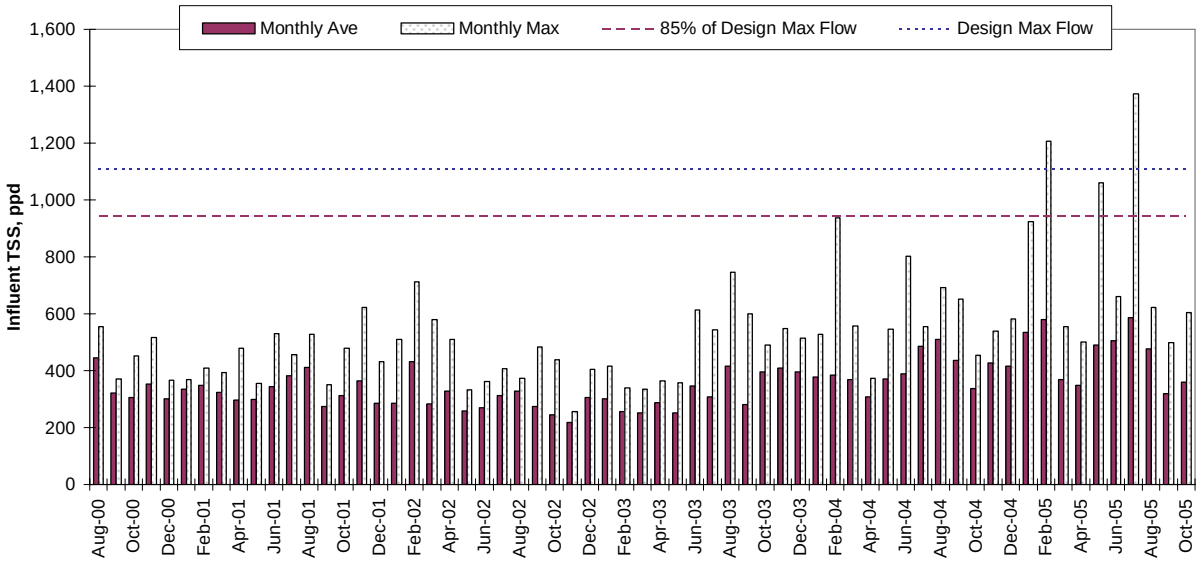
Discharge Monitoring Data, Flow and Effluent pH, 2000-2005



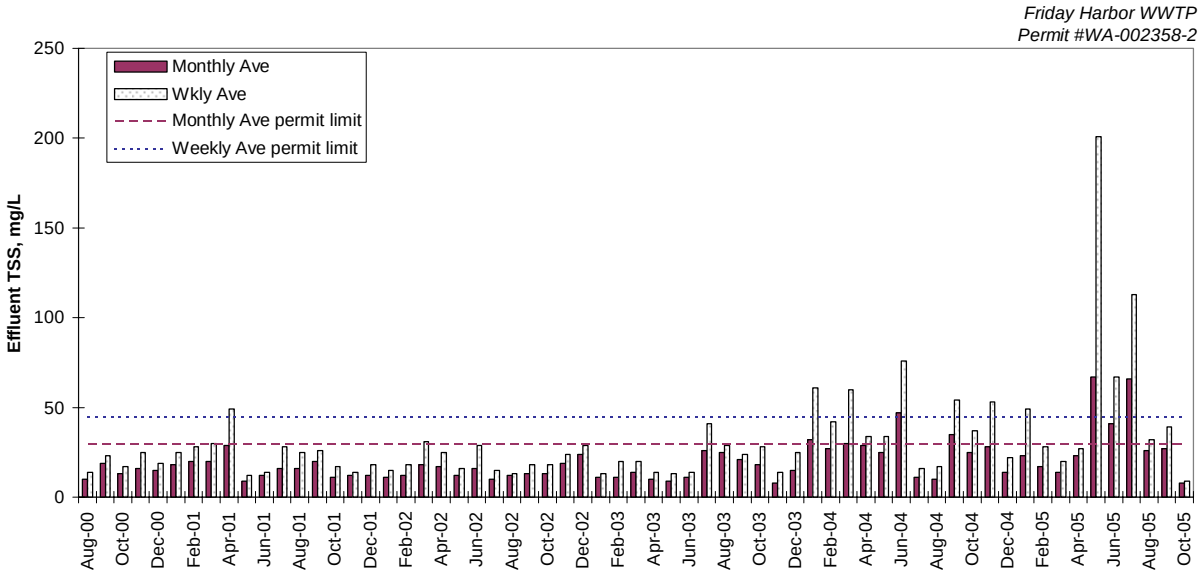


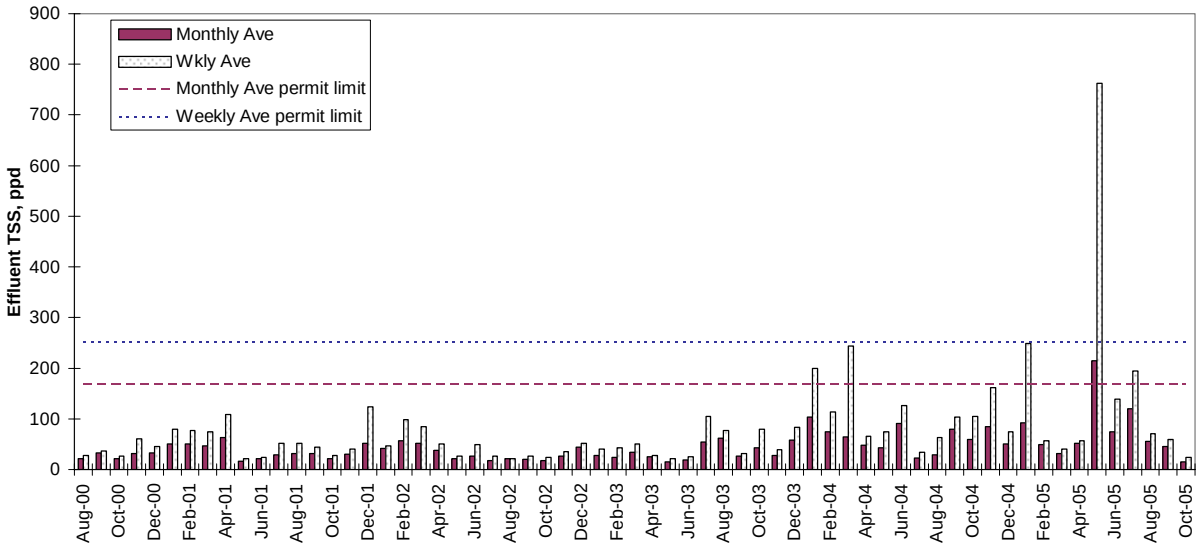
Discharge Monitoring Data, Influent TSS, 2000-2005



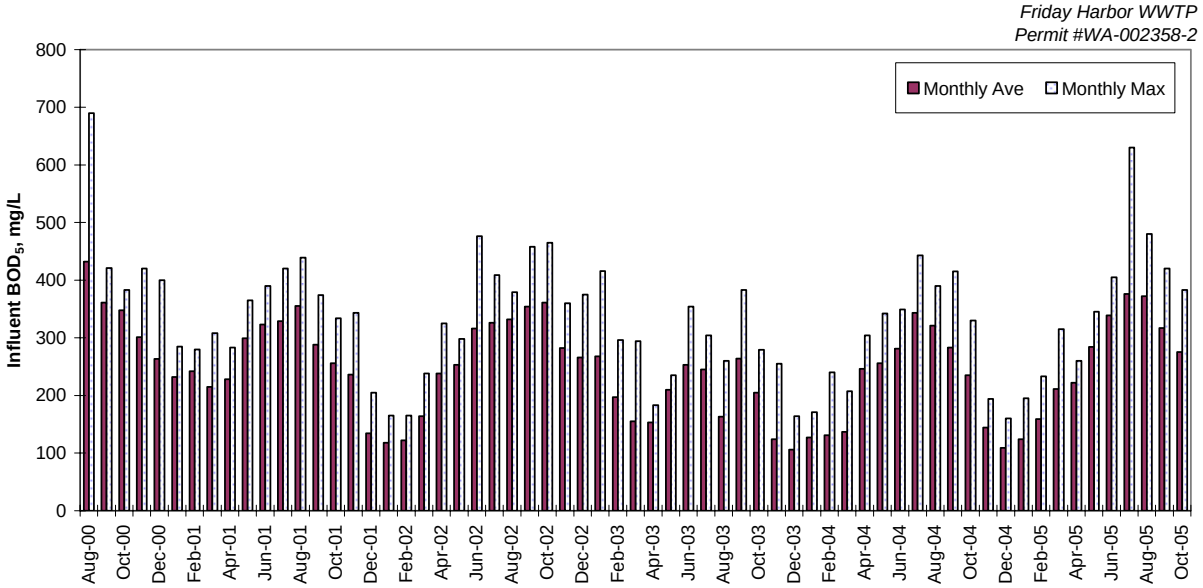


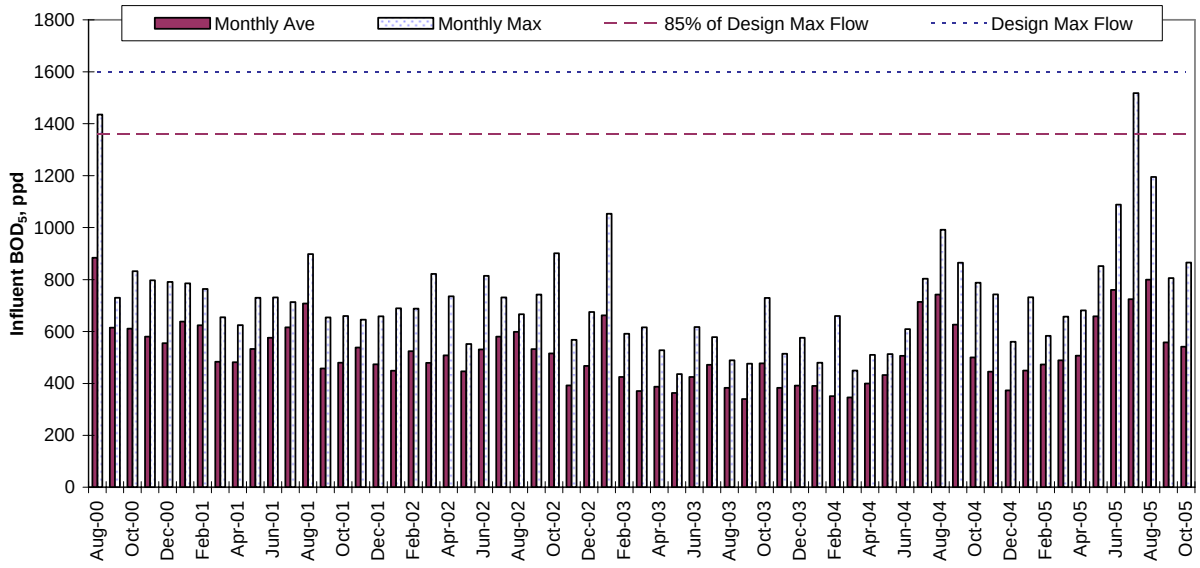
Discharge Monitoring Data, Effluent TSS, 2000-2005



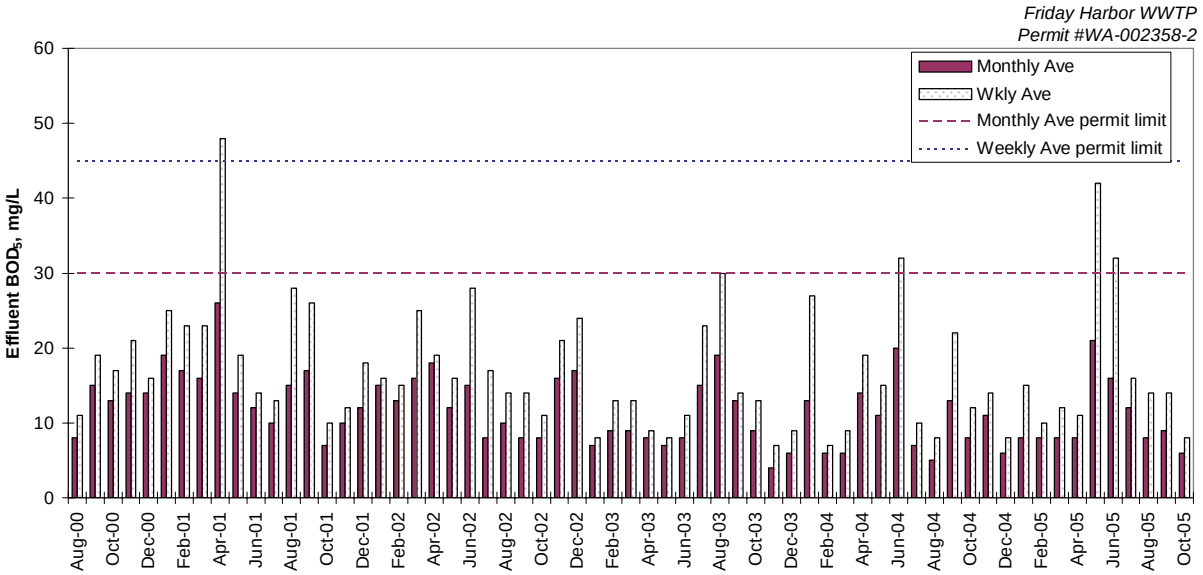


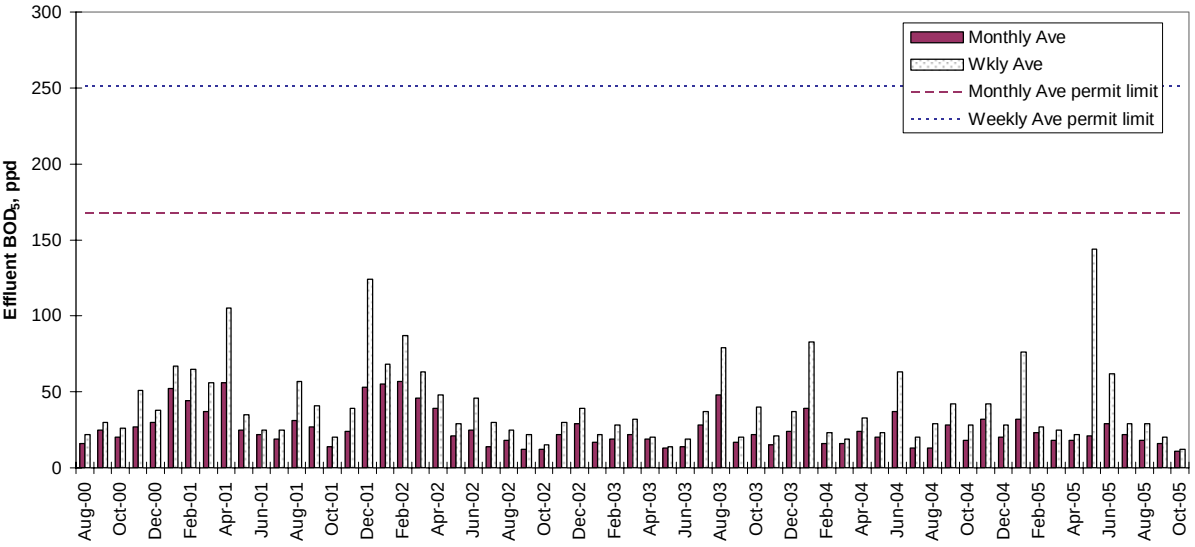
Discharge Monitoring Data, Influent BOD5, 2000-2005



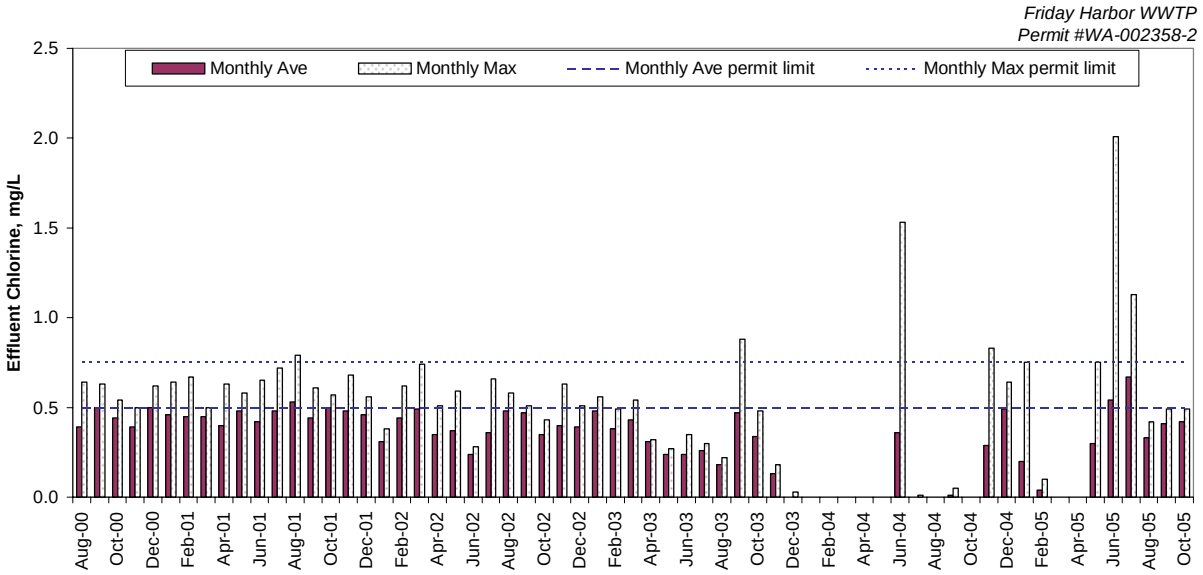


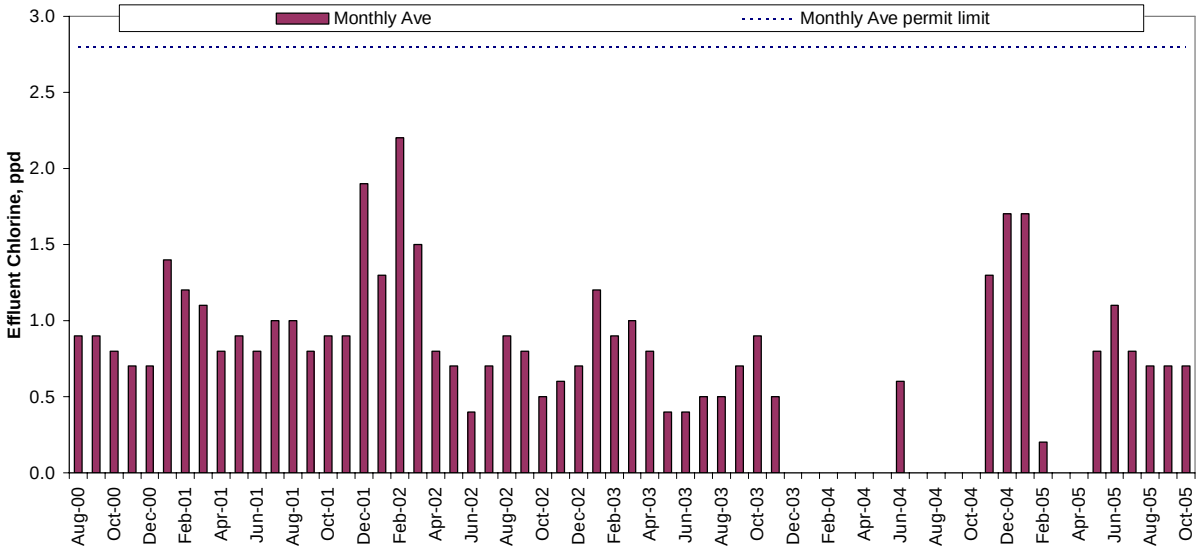
Discharge Monitoring Data, Effluent BOD5, 2000-2005





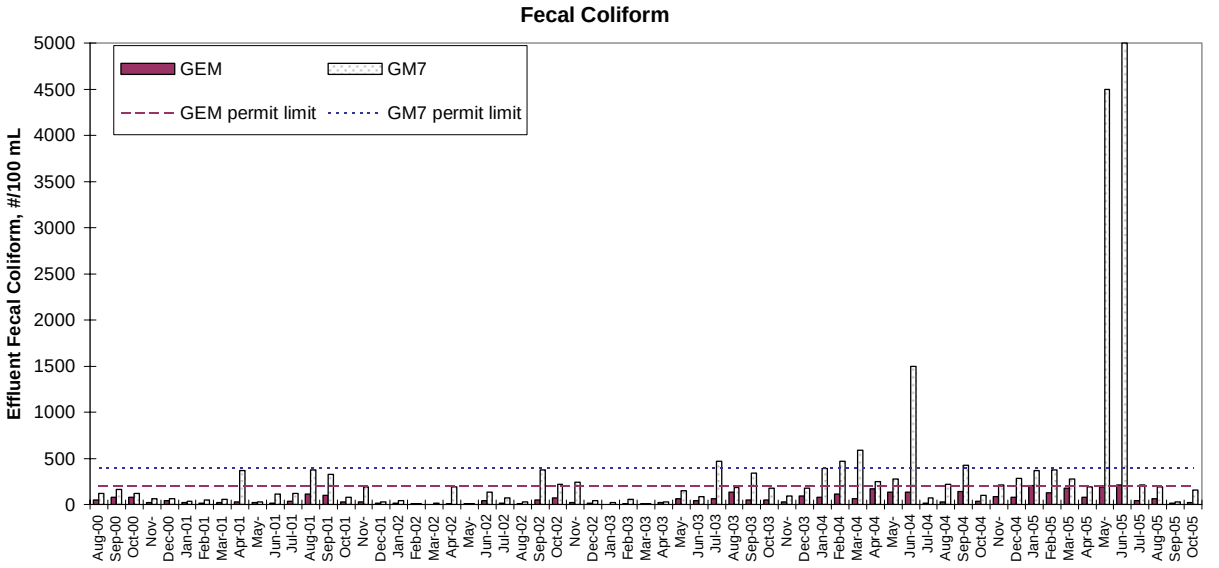
Discharge Monitoring Data, Residual Chlorine, 2000-2005





Discharge Monitoring Data, Effluent Fecal Coliform and Ammonia, 2000-2005

Friday Harbor WWTP
Permit #WA-002358-2



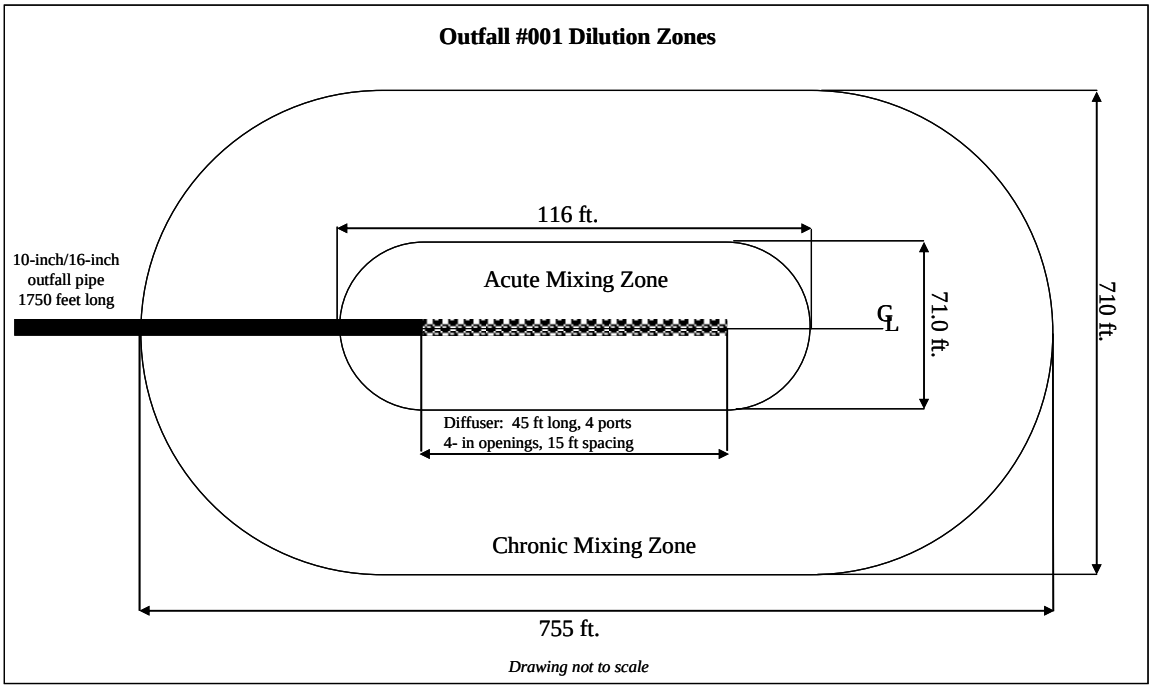
APPENDIX H—OUTFALL DILUTION ANALYSIS

Mixing Zone Size

Mixing zones are authorized for compliance with Water Quality Standards in accordance with restrictions established in Chapter 173-201A-100 WAC. Restrictions include geometric limitations based on the size and configuration of the outfall diffuser, as well as dimensions of the receiving water body. As defined in 173-201A-100 (c) WAC, the maximum chronic mixing zone size is limited as follows:

> "Shall not extend in any horizontal direction from the discharge port(s) for a distance greater than three hundred feet plus the depth of water over the discharge port(s) as measured during mean lower low water (MLLW)"

Given the MLLW depth of 55 feet, the chronic mixing zone for the facility's outfall will be allowed to have a maximum length of 355 feet from any point along the length of the diffuser. Based on a total diffuser length of 45 feet, the allowable chronic mixing zone will be elliptical in shape, with total length of: 45 ft + 2 x 355 ft = 755 ft; width will be 2 x 355 ft = 710 ft. The acute mixing zone can occupy a region with dimensions that are 10% of the chronic mixing zone area dimensions. Therefore, the acute mixing zone will have an allowable length of 116 ft (2 x 35.5 ft + 45 ft) and an allowable width of 71.0 ft. The sizes of both mixing zones are approximated in the following illustration.



Plumes Dilution Analysis

The following are results obtained from EPA's Visual Plumes software, which was used to estimate dilution factors for Friday Harbor's outfall.

Chronic Dilution Scenario: Summer season, Maximum Monthly Average Flow

/ Windows UM3. 1/17/2006 1:23:59 PM
Case 1; ambient file Z:\WWTP\Friday Harbor\WWTP\Permit 2005\Friday Harbor 2006.001.db; Diffuser table record 1: ----------

Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-spd	Far-dir	Disprsn
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2
0	0.0508	0	29.1	15.1	0	0	0.0508	0	0.0003
33	0.0508	0	30.1	11.1	0	0	0.0508	0	0.0003

P-dia	P-elev	V-angle	H-angle	Ports	Spacing	AcuteMZ	ChrncMZ	P-depth	Ttl-flo	Eff-sal	Temp	Polutnt
(in)	(ft)	(deg)	(deg)	()	(ft)	(ft)	(ft)	(ft)	(MGD)	(psu)	(C)	(ppm)
4	1.25	0	0	4	15	35.5	355	55	***0.5***	0.05	23.3	100

Froude number: 4.303

	Depth	Amb-cur	P-dia	Incrmnt	Polutnt	4/3Eddy	P-speed	Dilutn	x-posn	y-posn	
Step	(ft)	(m/s)	(in)	(s)	(ppm)	(ppm)	(m/s)	()	(ft)	(ft)	
0	55	0.0508	4	3600	100	100	0.676	1	0	0	
100	53.51	0.0508	17.65	3600	15.85	15.85	0.213	6.182	3.266	0	
200	45.01	0.0508	60.36	3600	2.187	2.187	0.132	44.65	8.57	0	
280	31.52	0.0508	177.9	3600	0.449	0.449	0.0736	217.6	18.32	0	axial vel 0.00865 trap level,
281	31.34	0.0508	180.6	3600	0.44	0.44	0.0728	222	18.51	0	merging,
300	28.58	0.0508	244	3600	0.331	0.331	0.0622	294.5	22.14	0	
301	28.48	0.0508	247.5	3600	0.328	0.328	0.0617	297.7	22.31	0	begin overlap,
356	26.03	0.0508	340.6	3600	0.271	0.271	0.0525	360.8	30.74	0	local maximum rise or fall,

4/3 Power Law. Farfield dispersion based on wastefield width of 22.37 m

conc	dilutn	width	distnce	time				
(ppm)		(m)	(m)	(hrs)	(kg/kg)	(s-1)	(m/s)	(m0.67/s2)
1.60E-03	***446.6***	44.76	108.2	0.54	0	0	0.0508	3.00E-04

Acute Dilution Scenario: Summer season, Peak Daily Flow

1:23:59 PM. amb fills: 2
/ Windows UM3. 1/17/2006 1:24:43 PM
Case 1; ambient file Z:\WWTP\Friday Harbor\WWTP\Permit 2005\Friday Harbor 2006.001.db; Diffuser table record 1: ----------

Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-spd	Far-dir	Disprsn
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2
0	0.0508	0	29.1	15.1	0	0	0.0508	0	0.0003
33	0.0508	0	30.1	11.1	0	0	0.0508	0	0.0003

P-dia	P-elev	V-angle	H-angle	Ports	Spacing	AcuteMZ	ChrncMZ	P-depth	Ttl-flo	Eff-sal	Temp	Polutnt
(in)	(ft)	(deg)	(deg)	()	(ft)	(ft)	(ft)	(ft)	(MGD)	(psu)	(C)	(ppm)
4	1.25	0	0	4	15	35.5	355	55	***1.76***	0.05	23.3	100

Froude number: 15.15

	Depth	Amb-cur	P-dia	Incrmnt	Polutnt	4/3Eddy	P-speed	Dilutn	x-posn	y-posn	
Step	(ft)	(m/s)	(in)	(s)	(ppm)	(ppm)	(m/s)	()	(ft)	(ft)	
0	55	0.0508	4	3600	100	100	2.378	1	0	0	
100	54.58	0.0508	26.43	3600	13.8	13.8	0.38	7.093	4.902	0	axial vel 0.00384
200	41.29	0.0508	102.9	3600	2.031	2.031	0.172	48.07	20.23	0	
241	28.73	0.0508	182.5	3600	0.902	0.902	0.122	108.2	28.78	0	axial vel 0.0162 merging,
250	25.14	0.0508	219.2	3600	0.755	0.755	0.109	129.4	31.53	0	trap level,
262	20.69	0.0508	297.8	3600	0.618	0.618	0.0911	157.9	35.55	0	acute zone,
269	19.26	0.0508	341.5	3600	0.577	0.577	0.0841	169.1	37.13	0	begin overlap,
300	16.14	0.0508	465.9	3600	0.52	0.52	0.0679	187.6	42.15	0	
339	15.29	0.0508	516.2	3600	0.511	0.511	0.0627	***191***	46.42	0	local maximum rise or fall,

4/3 Power Law. Farfield dispersion based on wastefield width of 26.83 m

conc	dilutn	width	distnce	time				
(ppm)		(m)	(m)	(hrs)	(kg/kg)	(s-1)	(m/s)	(m0.67/s2)
7.57E-03	226.2	49.08	108.2	0.514	0	0	0.0508	3.00E-04

APPENDIX I—WATER QUALITY LIMIT CALCULATIONS

Evaluating the need for water quality-based discharged limits is based on an analysis of the reasonable potential for the effluent to exceed water quality criteria as outlined in EPA's *Technical Support Document for Water Quality-based Toxics Control* (EPA/505/2-90-001, 1991). Criteria used in the analysis were taken from 173-201A WAC and are listed in the following table of pollutants of concern found in the Permittee's outfall(s).

WATER QUALITY CRITERIA (in ug/L unless otherwise noted)

	PRIOR ITY	CAR CIN	Water Quality Criteria				Human Health Criteria	
			Fresh		Marine			
Pollutant, CAS No. & Application Ref. No.	PLTNT?	GEN?	acute	chronic	acute	chronic	Fresh	Marine
AMMONIA unionized -see seperate spreadsheets for FW criteria	N	N			233	35		
ARSENIC (dissolved) 7440382 2M	Y	Y	360.00	190.00	69.00	36.00		
COPPER - 744058 6M Hardness dependent	Y	N	4.61	3.47	4.80	3.10		
SELENIUM 7782492 10M	Y	N	20.00	5.00	290.00	71.00	170.00	4200.00
ZINC- 7440666 13M hardness dependent	Y	N	35.36	32.29	90.00	81.00		
MERCURY 7439976 8M	Y	N	2.10	0.01	1.80	0.03	0.14	0.15
CHROMIUM(TRI) -16065831 5M Hardness dependent	N	N	176.31	57.19				
NICKEL - 7440020 9M - Dependent on hardness	Y	N	438.06	48.65	74.00	8.20	610.00	4600.00
SILVER - 7740224 11M dependent on hardness.	Y	N	0.32		1.90			
CHLOROFORM 67663 11V	Y	Y					5.70	470.00
TOLUENE 108883 25V	Y	N					6800.00	200000.00
CHLORINE (Total Residual) 7782505	N	N	19.00	11.00	13.00	7.50		

	Organoleptic Effects	Metals Translators			
		Freshwater		Marine	
Pollutant, CAS No. & Application Ref. No.		Acute	Chronic	Acute	Chronic
AMMONIA unionized -see seperate spreadsheets for FW criteria					
ARSENIC (dissolved) 7440382 2M		1.00	1.00	1.00	
COPPER - 744058 6M Hardness dependent	1000.00	1.00	1.00	0.83	0.83
SELENIUM 7782492 10M					
ZINC- 7440666 13M hardness dependent	5000.00	1.00	1.00	0.95	0.95
MERCURY 7439976 8M		0.85		0.85	
CHROMIUM(TRI) -16065831 5M Hardness dependent					
NICKEL - 7440020 9M - Dependent on hardness		1.00	1.00	0.99	0.99
SILVER - 7740224 11M dependent on hardness.		0.85		0.85	
CHLOROFORM 67663 11V					
TOLUENE 108883 25V					
CHLORINE (Total Residual) 7782505					

Calculated data used in evaluating the reasonable potential for water quality exceedance can be found in the following tables, along with the derivation of limits for chlorine. All calculations were made using Ecology's TSDCALC11 and PWSPREAD spreadsheets, which are available at the following web site: http://www.ecy.wa.gov/programs/eap/pwspread/pwspread.html.

Reasonable Potential Analysis for Water Quality Criteria Exceedence

This spreadsheet calculates the reasonable potential to exceed state water quality standards for a small number of samples. The procedure and calculations are done per the procedure in Technical Support Document for Water Quality-based Toxics Control, U.S. EPA, March, 1991 (EPA/505/2-90-001) on page 56. User input columns are shown with red headings. Corrected formulas in col G and H on 5/98 (GB)

Parameter	Metal Criteria Translator as decimal Acute	Metal Criteria Translator as decimal Chronic	Ambient Concentration (metals as dissolved) *ug/L*	State Water Quality Standard		Max concentration at edge of...		LIMIT REQ'D?
				Acute *ug/L*	Chronic *ug/L*	Acute Mixing Zone *ug/L*	Chronic Mixing Zone *ug/L*	
AMMONIA unionized -see seperate spreadsheets for FW criteria				2330.00	15490.00	136.95	58.57	NO
ARSENIC (dissolved) 7440382 2M	1.00			69.00	36.00	0.03	0.01	NO
COPPER - 744058 6M Hardness dependent	0.83	0.83		4.80	3.10	0.22	0.09	NO
SELENIUM 7782492 10M				290.00	71.00	0.14	0.06	NO
ZINC- 7440666 13M hardness dependent	0.95	0.95		90.00	81.00	0.76	0.32	NO
MERCURY 7439976 8M	0.85			1.80	0.03	0.01	0.00	NO
NICKEL - 7440020 9M - Dependent on hardness	0.99	0.99	0.0000	74.00	8.20	0.06	0.03	NO
SILVER - 7740224 11M dependent on hardness.	0.85		0.0000	1.90	0.00	0.01	0.01	NO
CHLORINE (Total Residual) 7782505			0.0000	13.00	7.50	11.52	4.93	NO

Parameter	Effluent percentile value	*Pn*	Max effluent conc. measured (metals as total recoverable) *ug/L*	Coeff Variation *CV*	*s*	# of samples *n*	Multiplier	Acute Dil'n Factor	Chronic Dil'n Factor	COMMENTS
AMMONIA unionized -see seperate spreadsheets for FW criteria	0.95	0.050	4220.00	0.60	0.55	1	6.20	191	447	
ARSENIC (dissolved) 7440382 2M	0.95	0.779	3.00	0.60	0.55	12	1.63	191	447	
COPPER - 744058 6M Hardness dependent	0.95	0.779	31.00	0.60	0.55	12	1.63	191	447	
SELENIUM 7782492 10M	0.95	0.779	16.00	0.60	0.55	12	1.63	191	447	
ZINC- 7440666 13M hardness dependent	0.95	0.779	94.00	0.60	0.55	12	1.63	191	447	
MERCURY 7439976 8M	0.95	0.779	1.30	0.60	0.55	12	1.63	191	447	
NICKEL - 7440020 9M - Dependent on hardness	0.95	0.779	7.00	0.60	0.55	12	1.63	191	447	
SILVER - 7740224 11M dependent on hardness.	0.95	0.779	2.00	0.60	0.55	12	1.63	191	447	
CHLORINE (Total Residual) 7782505	0.95	0.992	2200.00	0.60	0.55	365	1.00	191	447	

Reasonable Potential Analysis for Human Health Criteria Exceedence

Parameter	Ambient Concentration (Geometric Mean) *ug/L*	Water Quality Criteria for Protection of Human Health *ug/L*	Max concentration at edge of chronic mixing zone. *ug/L*	**LIMIT REQ'D ?**	**Expected Number of Compliance Samples per Month**	**AVERAGE MONTHLY EFFLUENT LIMIT** *ug/L*	**MAXIMUM DAILY EFFLUENT LIMIT** *ug/L*
SELENIUM 7782492 10M	0.00	4200.00	0.02	**NO**	**2**	**NONE**	**NONE**
MERCURY 7439976 8M	0.00	0.15	0.00	**NO**	**2**	**NONE**	**NONE**
NICKEL - 7440020 9M - Dependent on hardness	0.00	4600.00	0.01	**NO**	**2**	**NONE**	**NONE**
CHLOROFORM 67663 11V	0.00	470.00	0.01	**NO**	**2**	**NONE**	**NONE**
TOLUENE 108883 25V	0.00	200000.00	0.02	NO	**2**	NONE	NONE

Parameter	Estimated Percentile at 95% Confidence	*Pn*	Max effluent conc. measured *ug/L*	Coeff Variation *CV*	**S**	# of samples from which # in col. K was taken *n*	Multiplier	Calculated 50th percentile Effluent Conc. (When n>10)	Dilution Factor
SELENIUM 7782492 10M	0.50	0.78	16.00	0.60	0.6	12	0.65		446.6
MERCURY 7439976 8M	0.50	0.78	1.30	0.60	0.6	12	0.65		446.6
NICKEL - 7440020 9M - Dependent on hardness	0.50	0.78	7.00	0.60	0.6	12	0.65		446.6
CHLOROFORM 67663 11V	0.50	0.05	1.50	0.60	0.6	1	2.49		446.6
TOLUENE 108883 25V	0.50	0.05	4.20	0.60	0.6	1	2.49		446.6

Calculation of pH of a mixture in seawater.
Based on the CO2SYS program (Lewis and Wallace, 1998)
http://cdiac.esd.ornl.gov/oceans/co2rprt.html

INPUT

1. MIXING ZONE BOUNDARY CHARACTERISTICS	
Dilution factor at mixing zone boundary	446.600
Depth at plume trapping level (m)	9.600
2. BACKGROUND RECEIVING WATER CHARACTERISTICS	
Temperature (deg C):	11.10
pH:	7.90
Salinity (psu):	30.10
Total alkalinity (mmol/L)	2.12
3. EFFLUENT CHARACTERISTICS	
Temperature (deg C):	23.30
pH:	6.40
Salinity (psu)	0.70
Total alkalinity (mmol/L):	3.00

4. CLICK THE 'calculate" BUTTON TO UPDATE OUTPUT RESULTS >>> calculate

OUTPUT

CONDITIONS AT THE MIXING ZONE BOUNDARY	
Temperature (deg C):	11.13
Salinity (psu)	30.03
Density (kg/m^3)	1022.93
Alkalinity (mmol/kg-SW):	2.07
Total Inorganic Carbon (mmol/kg-SW):	1.97
pH at Mixing Zone Boundary:	7.89